TECHNOLOGY DEPT.

ELECTRICAL REVIEW

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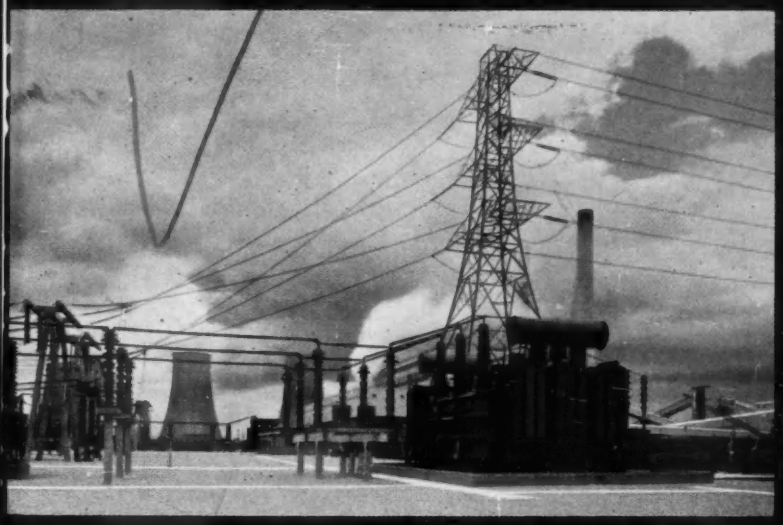

HERE are just two examples of the current contribution to power station development made by Metropolitan-Vickers, who continue to lead electrical progress in the design and manufacture of all types of turbine-generators and associated equipment.

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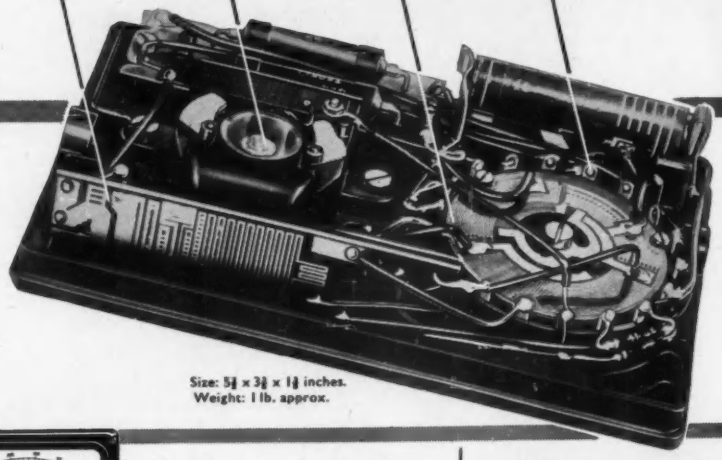

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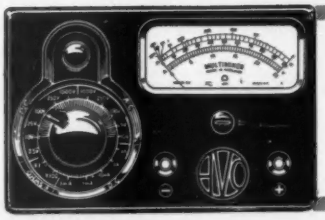

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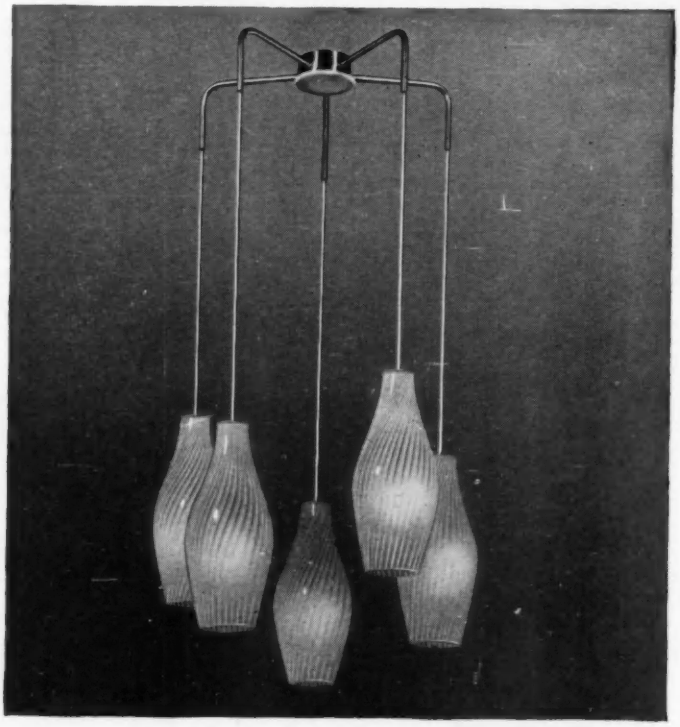

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At Margam, for the Steel Company of Wales, they are building a once-through forced circulation boiler to generate 240,000 lb. of steam per hour at 3,300 p.s.i. and 1,060°F with re-heat to 840°F.
This is the first Benson-type boiler to be built in Britain and the steam conditions are the most advanced ever commercially used in this country.
At the Padiham 'B' power station of the Central Electricity Generating Board, Simon-Carves are to build a 120-MW reheat boiler unit of the continuous-slagging type. This unit, which will generate 860,000 lb per hour of steam at 1,600 p.s.i. and 1,010°F, with reheat of 785,000 lb per hour to 1,005°F, will be one of the first, if not actually the first, of this type to be built in this country.
It will convert the whole of the ash and the dust into slag and thereby both avert the nuisance of handling and disposing of fine ash and produce a usable product.
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SC181

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BTH 45-MVA, 132/33-kV three-phase bank of single-phase transformers at Springfield Sub-station, Durban. Twelve of these units, plus six 132/88-kV units of the same power rating, have been supplied to the Electricity Supply Commission of South Africa (Natal Under-taking) for the Durban/ Colenso Interconnector.

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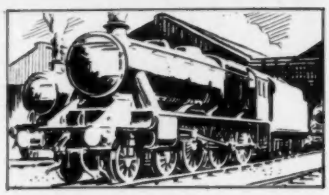
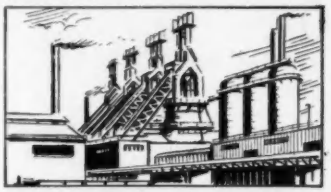
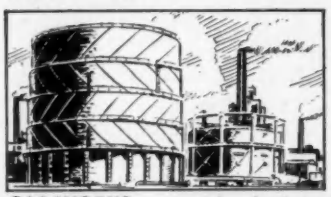


LOCOMOTIVE SHEDS "installed over a railway turntable . . . not been attacked in any way by the corrosive fumes . . . interior of the reflectors perfectly clean."



STEEL WORKS "Reflectortight fitted in Sulphate House — no noticeable corrosion, reflector found to be in perfect condition."



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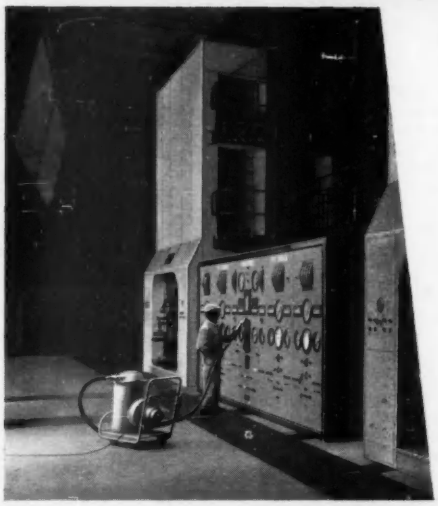

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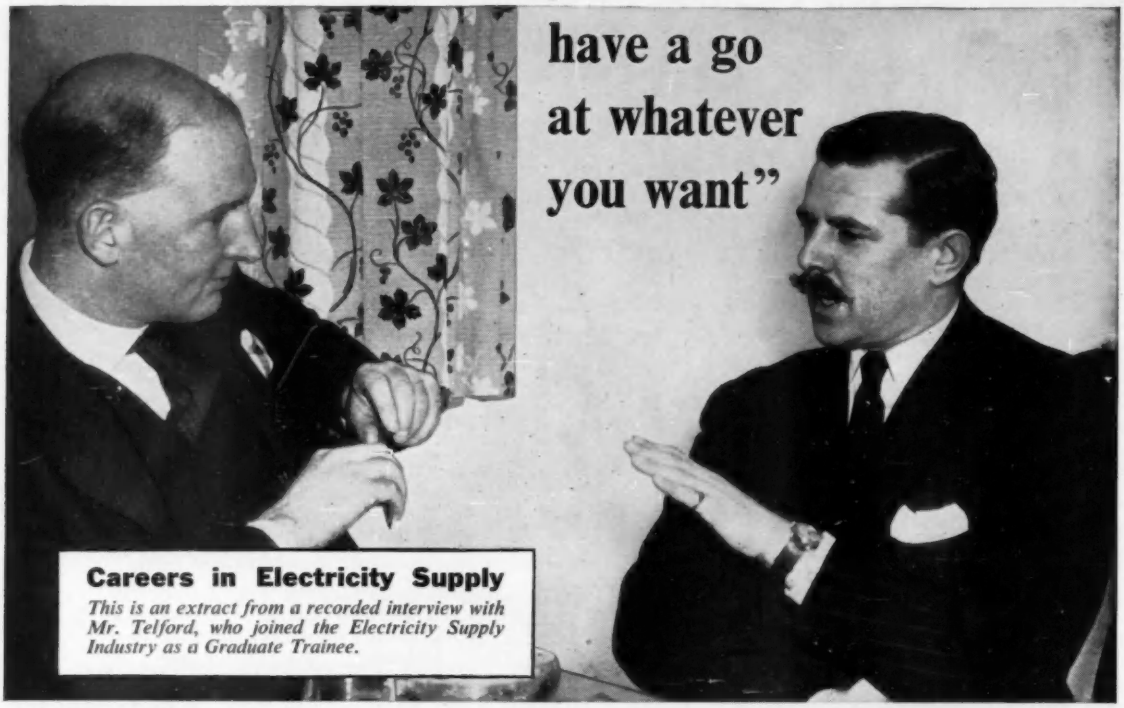

Careers in Electricity Supply

This is an extract from a recorded interview with Mr. Telford, who joined the Electricity Supply Industry as a Graduate Trainee.

E.S.I. Question Master — *Mr. Telford.*

Question Master: **I think we might begin by asking what was your first job in Electricity Supply after your training was finished?**

Mr. Telford: Well, my training was interrupted by the war, and it was only in 1950 that I finished my graduate course in the industry. I was then appointed Shift Charge Engineer at Frome, Somerset—a small station but an excellent training ground. From there I went to Earley—a much bigger station of 120 megawatts—as Boiler House Shift Engineer; later I became Charge Engineer there, and for a while was Efficiency Engineer, as well.

Q.M.: **Your next step was London, wasn't it?**

Telf: Yes, I came to London as Second Assistant Engineer on the Divisional Staff, and later I was appointed Deputy Superintendent at Bankside Generating Station—the position which I hold now.

Q.M.: **Bankside is a pretty big station, and at 36 you're young, aren't you, to be a Deputy Superintendent? But what made you come to London in the first place?**

Telf: A chance came along to get some administrative experience at H.Q. level, and I thought I'd better take it!

Q.M.: **Does the Industry give many opportunities like that?**

Telf: It most certainly does. It gives you a complete opportunity to have a go at whatever you want, and what you think you're best equipped for. The man who wants to get on is helped in every possible way; I've attended several courses run by the Industry, not only on technical matters, but on subjects like personnel selection and industrial relations.

Q.M.: **You find your job gives you scope for managerial ability—dealing with people as well as machines?**

Telf: Yes, indeed. I don't think there are many better opportunities than in a power station, because you have something of everything. You have the mechanical side, the electrical side, the building side—and most of all, a number of people with varied interests and jobs.

Q.M.: **Now a word about newcomers to the industry. If you have a chap of ability who is prepared to get down to the task, what would you say his opportunities were like?**

Telf: I would say that he has really splendid opportunities. For one thing, a career in the industry is established on a very firm footing—you could do without a lot of things, but it's impossible to get on nowadays without electrical energy. Another point worth remembering is that a man coming into the industry has the choice of the entire country to work in, and there's no parochial approach.

We'd like to publish more of this interview, but there isn't space. For details of the many careers in the Electricity Supply Industry and the salaried training schemes available ask at your local Generating or Distribution Board's offices, or write direct to:

The Education and Training Officer,
The Electricity Council,
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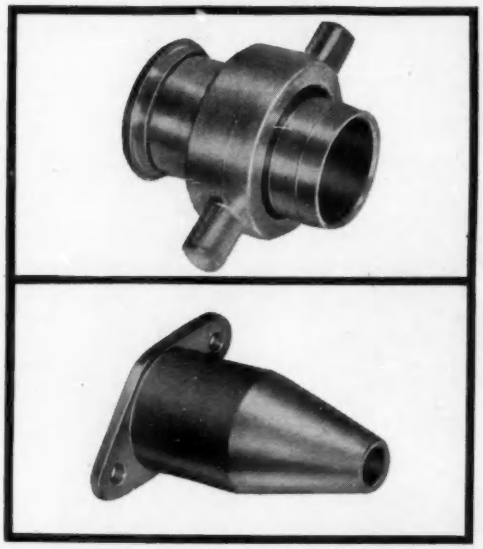

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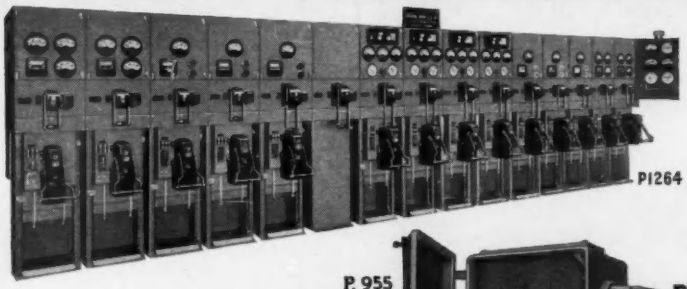
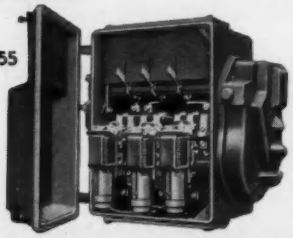


P1264

P1264 Illustrated left, Switchboard recently supplied for controlling diesel Alternator Sets and Feeders at a large Sewage Works. This Switchboard is of the duplicate busbar type and contains circuit breakers ASTA tested at 25 MVA to BS. 116 at 400 volts.



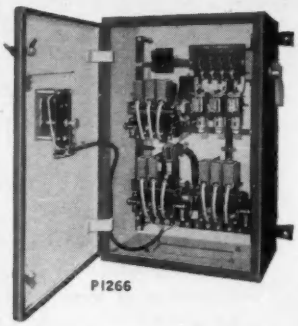
P. 955

P 955 Illustration on the right is of a hand-operated air break star delta starter, fitted with interlocked isolator and solenoid type overloads with time lags. This starter can also be supplied as a direct-on starter.

P1044

P1044 Illustrated right. Combined type stator and rotor starter showing tank removed. No interlocks required as stator and rotor contacts are on same drum in correct sequence. There is also a great saving in floor space.

CONTACTOR TYPE SWITCHGEAR & MOTOR CONTROL GEAR

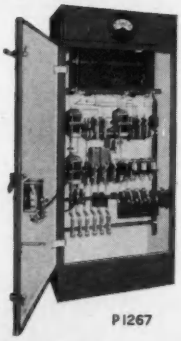


P1266

P1271 Illustrated right. Multi motor panel, contactor type Switchboard, comprising contactor type stator and rotor starters and star delta starters with fully interlocked isolating switches. This switchboard is one of many supplied to one of the leading Petroleum Companies.

P1271

P1266 Starter illustrated above is one of our CS. 30 pattern star delta starters, suitable for use up to 20 H.P. This type of starter is made in different ranges up to 100 H.P.



P1267

P1267 Starter illustrated at the left is a 50 H.P. CS. 75 type stator and rotor starter. This starter is made in different ranges up to 100 H.P. All our contactors above the CS. 15 size are bar mounted with powerful magnetic blowouts.

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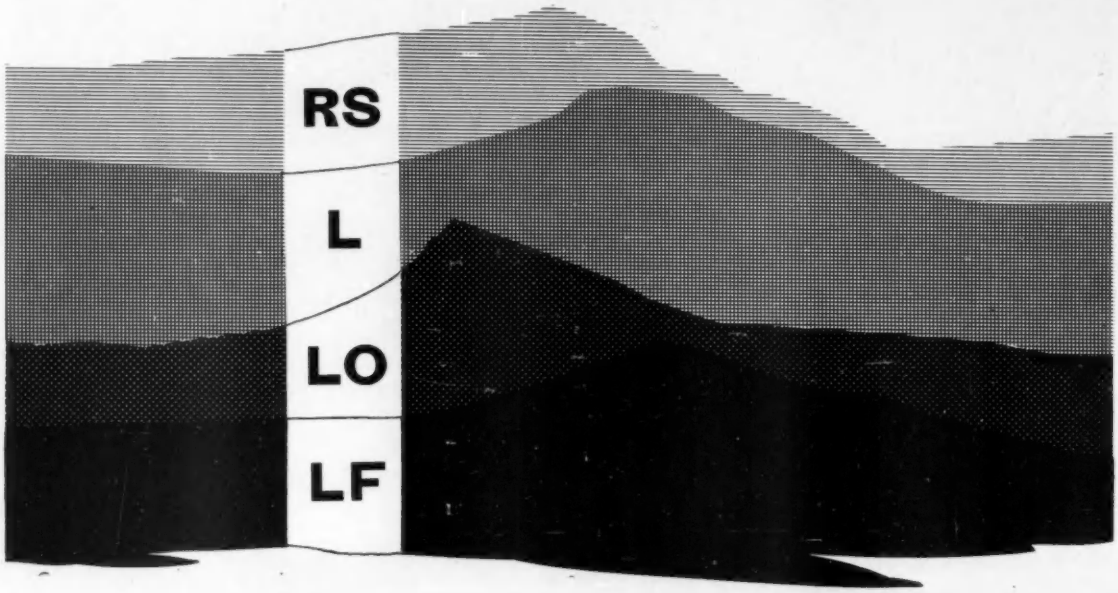

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Direct coupled flange mounted exciter.

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82½–600 kVA. Revolving field.
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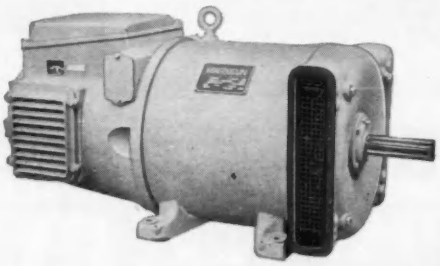
Macfarlane Magnicon Alternators have an inherent voltage regulation ± 2½%, independent of load conditions.



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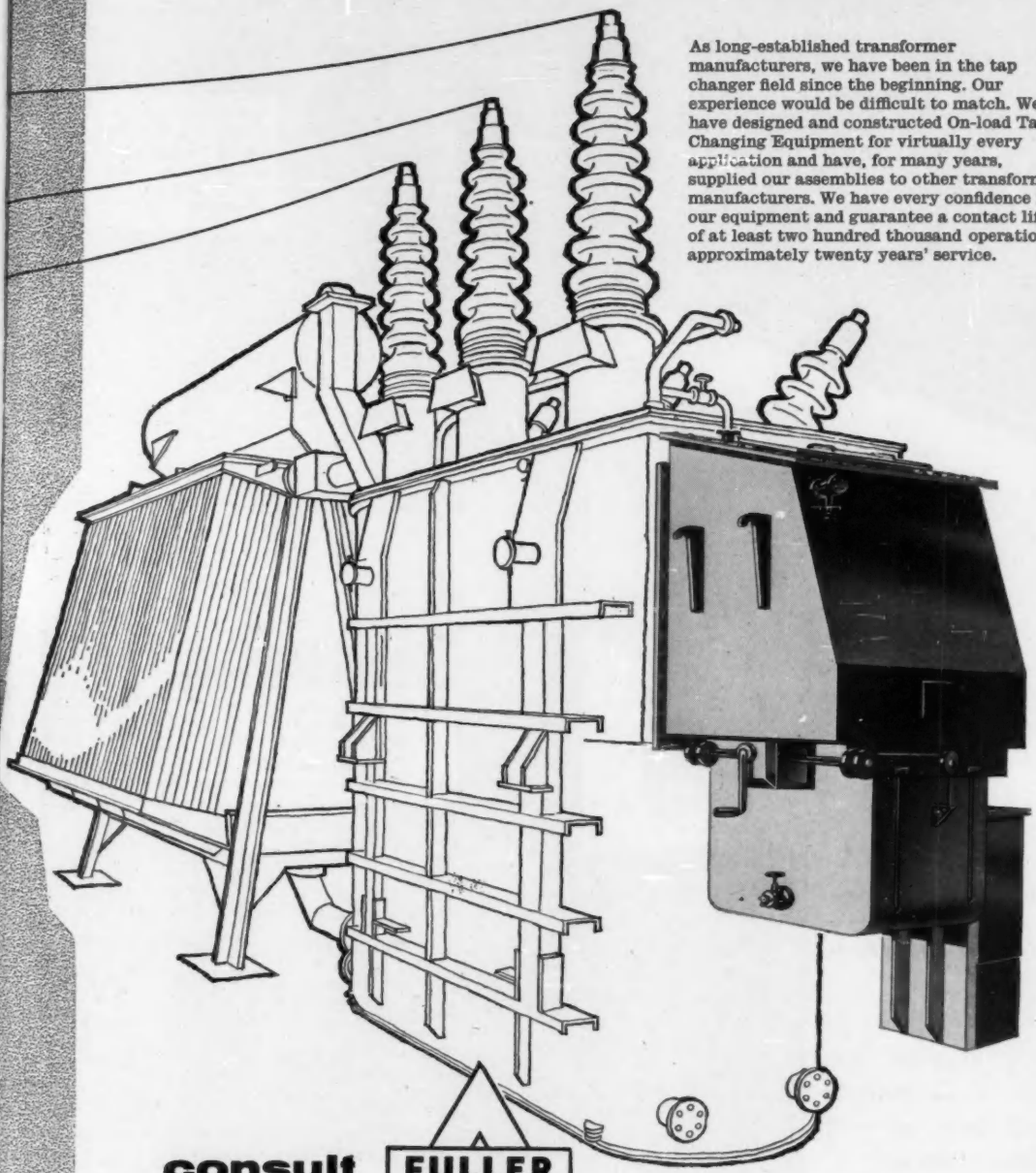

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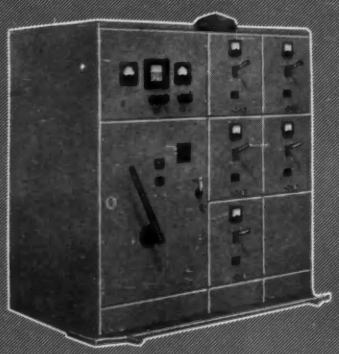
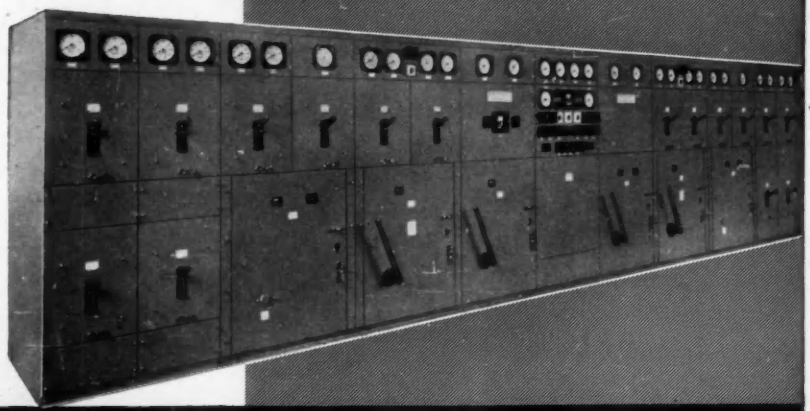


A fine example of an **A/C BOARD** constructed for a large steelworks in this country.

The above photograph shows in some detail an **A/C INDUSTRIAL TYPE SWITCHBOARD** supplied to a large tyre manufacturer.

A D/C CUBICLE TYPE SWITCHBOARD equipped with withdrawable D/C breakers, as supplied to Harbour Boards, Steelworks and Atomic Power Stations.



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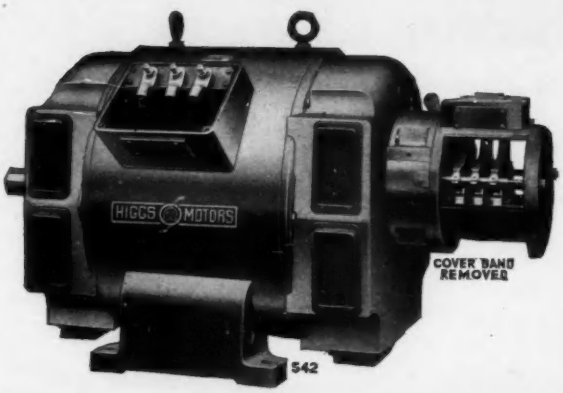

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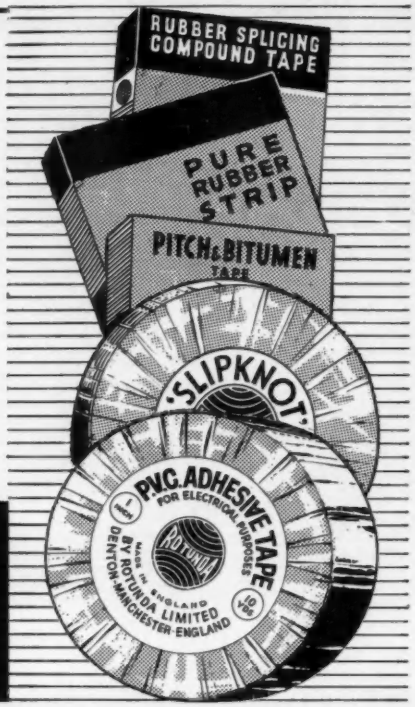

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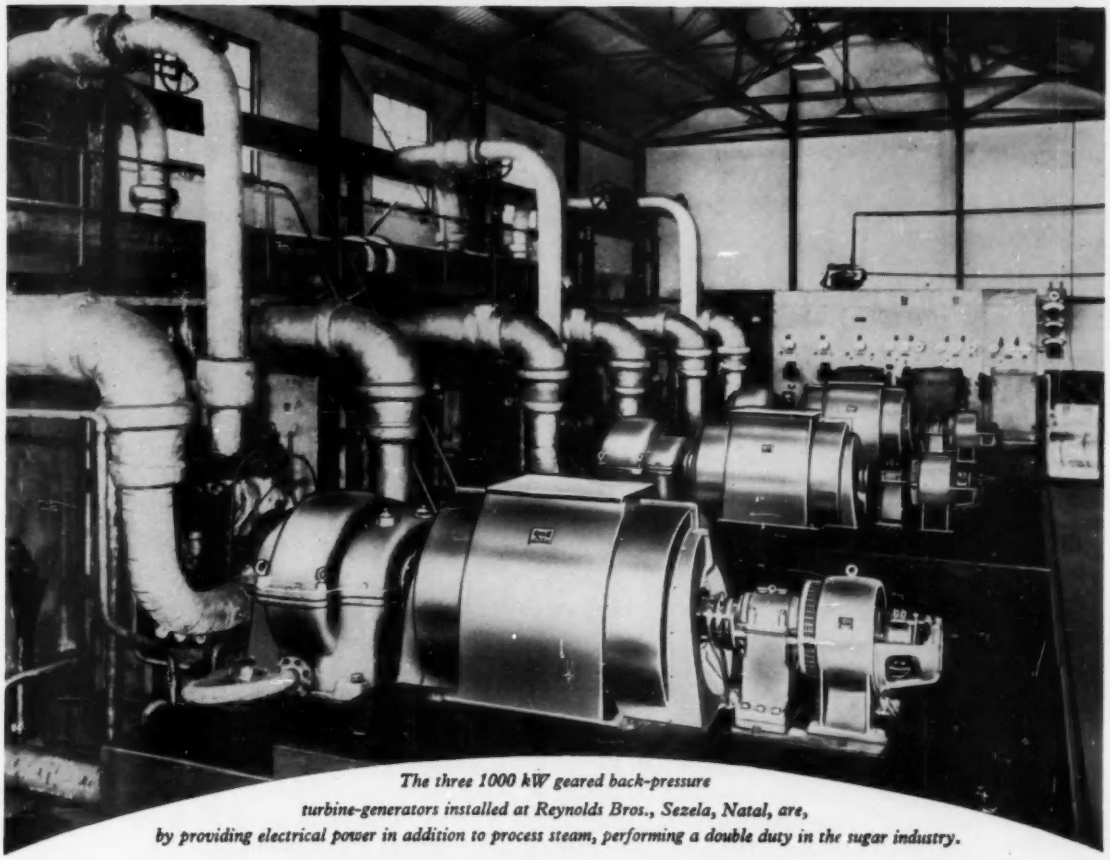


The three 1000 kW geared back-pressure turbine-generators installed at Reynolds Bros., Sezela, Natal, are, by providing electrical power in addition to process steam, performing a double duty in the sugar industry.

-cut your fuel costs

Great advantages can be gained by installing small back-pressure turbines for heating and process steam requirements in large factories. The back-pressure turbine is relatively cheap to install, occupies little space and requires only light foundations.

When Metropolitan-Vickers first installed one of their own back-pressure turbines at their Trafford Park Works in 1948 the cost of power and heating requirements for the factory were reduced by over £9,000 a year.

Please write for further details.

METROPOLITAN-VICKERS
ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER, 17

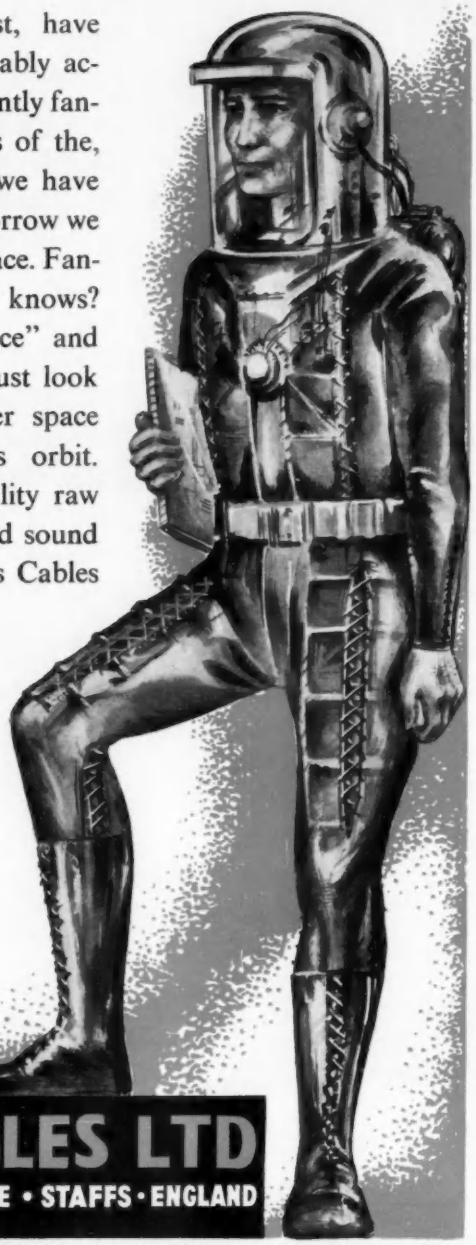
An A.E.I. Company

8/L 702

A*

A WORLD OF DIFFERENCE

Writers, of the past, have proved to be remarkably accurate in their apparently fantastic fictional stories of the, then, future. Today we have the atomic age, tomorrow we shall control outer space. Fantastic again, but who knows? A "world of difference" and yet the old world must look the same from outer space as it moves in its orbit. Similarly all cables may look the same, but quality raw materials, adherence to approved specifications, and sound workmanship prove in the long run that in Rist's Cables there is a "world of difference".



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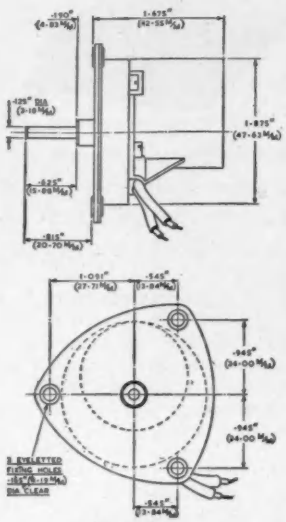
RISTS WIRES & CABLES LTD

LOWER MILEHOUSE LANE • NEWCASTLE-UNDER-LYME • STAFFS • ENGLAND

Sole London Distributors: LYMELITE ELECTRICAL INDUSTRIES LTD. 130/4 PENTONVILLE RD. LONDON, N.1 Tel.: TERminus 9631/2



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★ SELF STARTING
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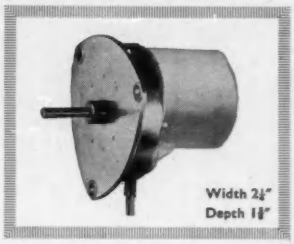

Sintered bronze rotor bearings ensure long life. Power consumed 2 watts. Write or telephone now for full details of this compact, totally enclosed LIGHT DUTY Motor Unit.

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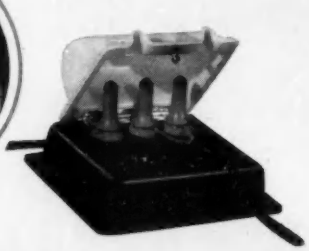
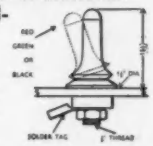


Your customers' time and your own—is saved—and demonstrations proceed smoothly with the T.I.M. Snap-action APPLIANCE CONNECTOR

All kinds of electrical appliances can be connected and disconnected in a few seconds with absolute safety to the assistant, the appliance, and your mains wiring. Your showroom gives an added impression of electrical efficiency with this practical, good-looking connector panel in use.



When raised the panel lid operates switches which break all circuits. The three spring-loaded, fully insulated Mycalex Quick-release Terminals have colour identifications. For A.C. only; 15 amps.

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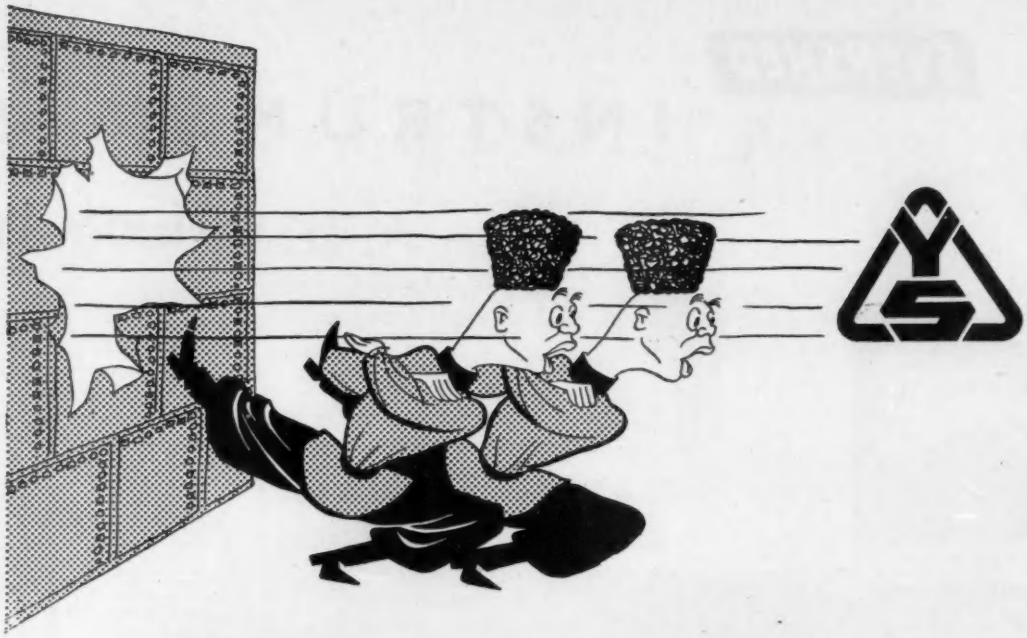

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In the friendliest possible fashion, Yorkshire Switchgear punctured the Iron Curtain.

Fifteen metalclad boards, comprising one hundred and thirty-one units of Yorkshire Switchgear IVIO oil circuit breakers have been supplied for outdoor use and for heavy duty underground service in non-gaseous mines in Poland.

Yorkshire Switchgear's high—and world-wide—reputation for heavy duty apparatus brought yet another substantial export order to this country.

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A wide selection of ammeters, voltmeters and wattmeters. Round or square faced patterns available.

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An essential instrument for industries where water purity is of prime importance. Detects dissolved impurities in steam or water. Models available for Power Stations, Marine installations or Laboratories.

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Speed indication for ship, turbine, printing and power shaft revolutions.

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This small pencil type gauge can be used for measuring the thickness of non-magnetic coatings such as paints and plating on ferrous bases.
Range 0.0002-0.015 inches.

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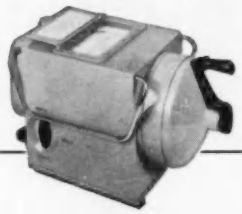
For surveys by resistivity method, ideal in prospecting for mineral deposits, shallow water supplies and depth of bed rock for dam foundations.



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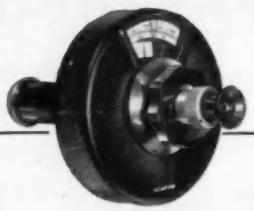
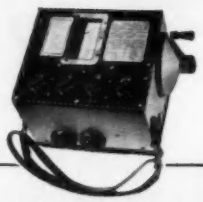
'Megger' Insulation and Insulation and Resistance Testers available with testing pressures up to 10,000 volts and ranges up to 100,000 megohms. Hand driven or Mains operated.



OPTICAL PYROMETER

A high precision direct reading instrument for measuring the temperature of visible radiating bodies quickly and accurately without actual contact.



BRIDGE 'MEGGER' TESTER

Combined Insulation Tester and Wheatstone Bridge. Ideal for measuring to a high degree of accuracy, insulation resistance and a wide range of conductor resistances; also fault location on telephone cables.
Testing pressures up to 1,000 volts.
Ranges up to 2,000 megohms.

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For routine tests on cable bonds, earthing conductor joints, lightning conductors, etc.
Available in two types:
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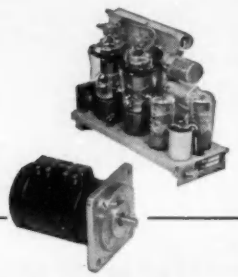
'MEGGER' EARTH TESTERS

Self-contained instruments for measuring directly the resistance to earth of earth plates and earth specific resistance.
Three different series provide ranges up to 30,000 ohms.



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Low resistance testing set

Ideally suitable for testing the resistance of switch contacts, rail bonds, armature windings, transformer windings, copper bars, fuses, soldered joints, earth continuity conductors, etc.

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For rapid measurement of insulation and conductor resistance of components during manufacture. A mains operated direct reading ohmmeter. These instruments are available for Switchboard or Bench use.

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A highly efficient, quick and simple analytical instrument available with or without recording facilities.

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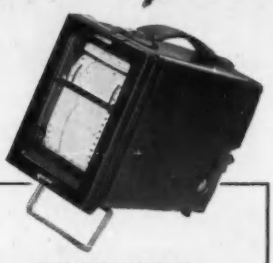
Moving iron or moving coil ammeters, voltmeters and dynamometer wattmeters. Industrial and Laboratory types available.



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A compact tapping type instrument suitable for either flush or projecting mounting, or for portable use. Variable chart speeds. Other single and multi-pen types and Quick Response Recorders available.

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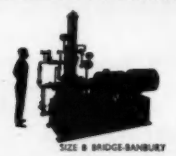
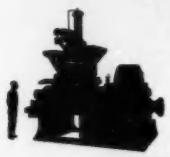
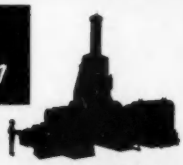

SIZE 8 BRIDGE-BANBURY

SIZE 3A BRIDGE-BANBURY


SIZE 9 BRIDGE-BANBURY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Even more compact . . .

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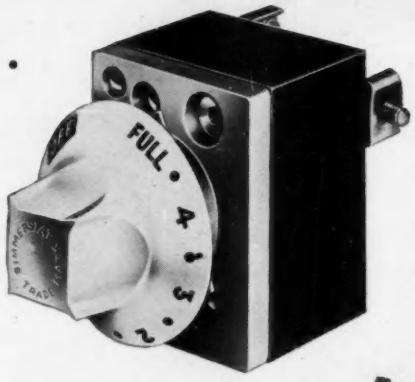

the NEW

'Simmerstat'

Regulator TYPE TYX/B

This new 'Simmerstat' is even smaller. It fits comfortably into any cooker switch chamber and can easily replace multi-heat switches since it uses the same fixing holes. Housewives appreciate the 'Simmerstat' with its smooth finger-tip control of hotplates from slow simmer to fast boil—and the fact that it reduces electricity consumption by as much as 50%. 'Simmerstats' for grill and grill-boiler control are increasingly popular.

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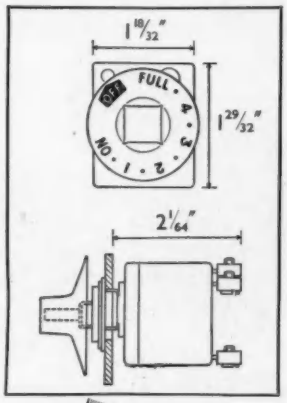
Full specification in Technical Publication 3041 from:
Sunvic Controls Limited, P.O. Box 1, Harlow, Essex.
Tel: Harlow 25271.



* *For the Few* housewives who still do not know about the 'Simmerstat', there is an attractive consumer leaflet. Supplies on request.

SUNVIC
An A.E.I. Company

'Simmerstat', water heater, air and oven thermostats

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and above all . . . precision !

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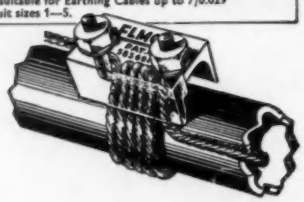
A COMPLETE RANGE TO B.S.951. 1948 IN 4 SIZES

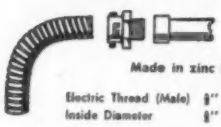
	A123	B45	C67	D8910
for earthing cables up to	7/0.036"	7/0.064"	19/0.064"	19/0.083"
to fit B.S. conduit sizes i.e. in trade terms	1, 2 & 3 ⅜" to ¾"	4 & 5 1" and 1½"	6 & 7 1½" and 2"	8, 9 & 10 2½" to 3½"

NOTE ALSO: Type A123 is suitable for Earthing Cables up to 7/0.029" and for B.S. conduit sizes 1—5.



"Elmo" Earthing Clamps are of robust construction. Impossible for wire to pull out, always under tension, therefore a most satisfactory earth and a permanent safeguard

ELECTRICAL FITTINGS

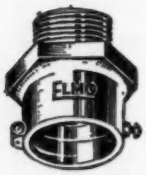


Flexible-to-rigid

CONDUIT COUPLINGS

Made in zinc base alloy in the following sizes

Electric Thread (Male)	⅜"	¾"	1"	1¼"	1½"	2"
Inside Diameter	⅜"	¾"	1"	1¼"	1½"	2"
Electric Thread (Male)		⅜"	¾"	1"	1¼"	
Inside Diameter Flexible Conduit		⅜"	¾"	¾"	1"	



WITH EARTHING TERMINAL

Special Features: Integral Earthing Terminal, tinned ready for soldering. Fixing screw for continuity. Internal threads suit all makes of flexible tubing.

CONDUIT BUSHES

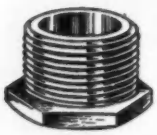
Made in the following sizes:

MALE: Electric Thread

⅜" ¾" 1" 1¼" 1½" 2"

FEMALE: Electric Thread

⅜" ¾" 1" 1¼" 1½" 2"



MALE
Hex. Section

FEMALE
Flat Face Section for Spanner (except ¾" size, which is round)

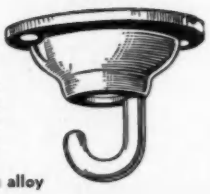
CONDUIT HOOK

For fluorescent lamps and overhead lighting fittings. Screwed ¾" male electric thread.

Made to fit all standard boxes with two holes 7/32" diameter — 2" centres diametrically opposed. Designed in accordance with British Standard Specification.

CEILING PLATE

One hook



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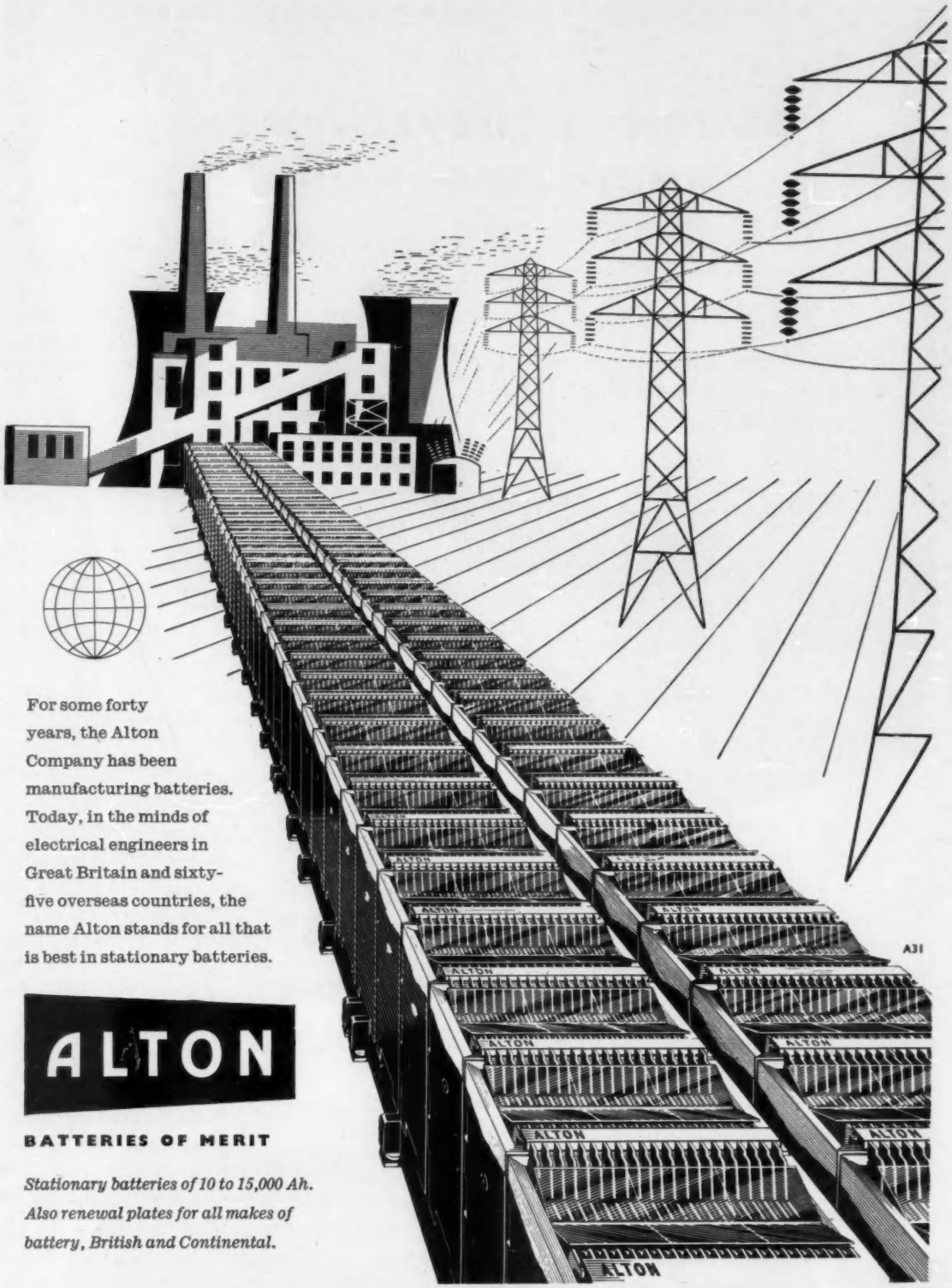

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Stationary batteries of 10 to 15,000 Ah. Also renewal plates for all makes of battery, British and Continental.

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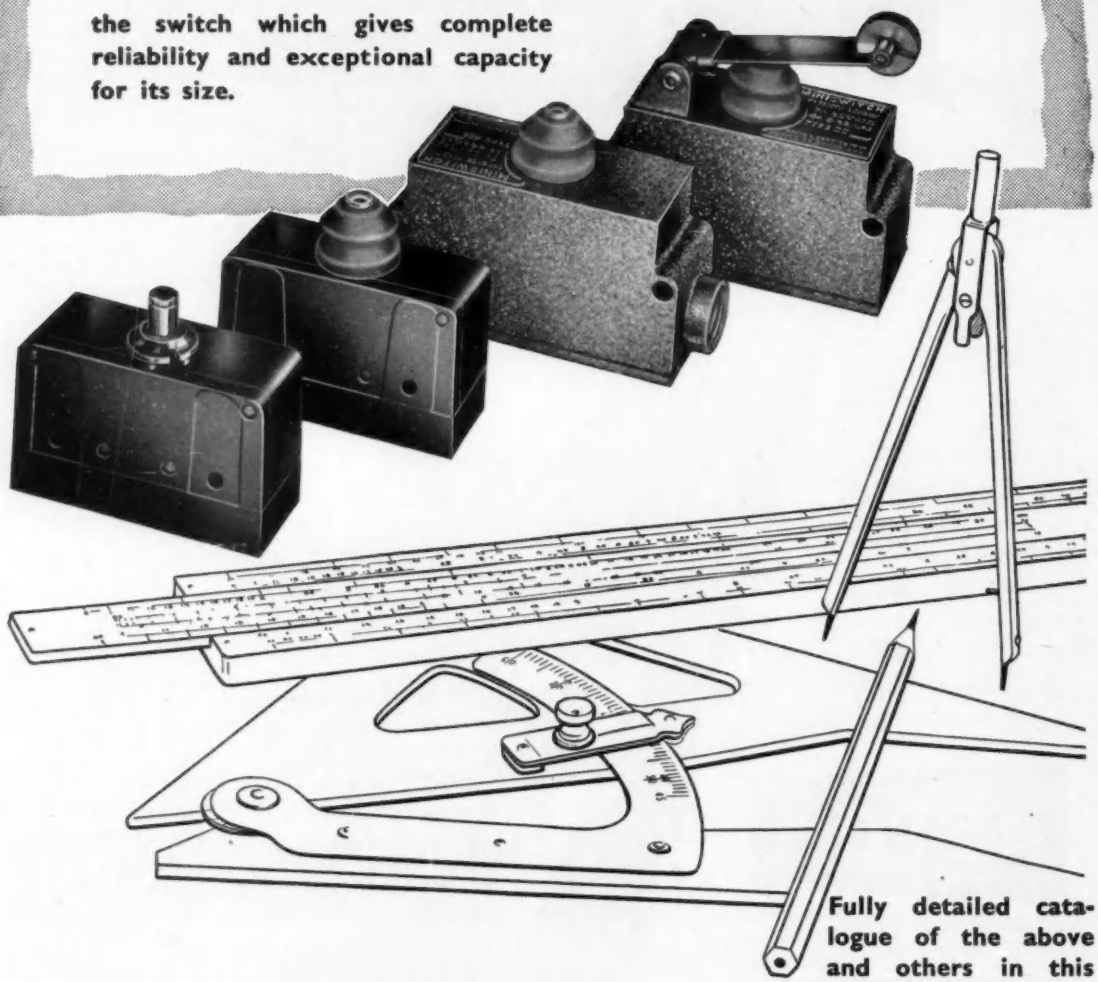
when miniature snap-action switches are needed it means the

"MINI-SWITCH"

the switch which gives complete reliability and exceptional capacity for its size.



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peace of mind

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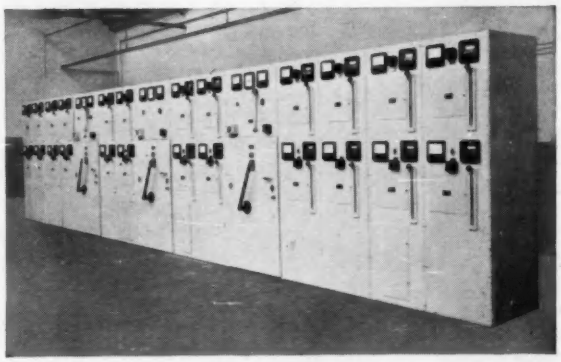

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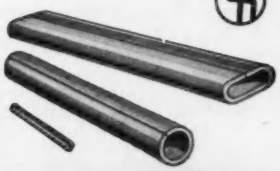

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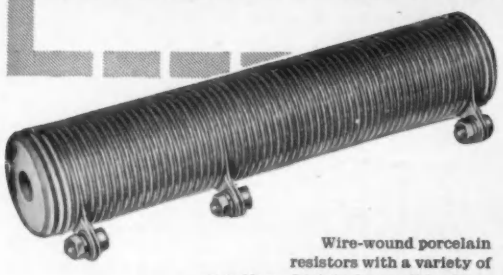
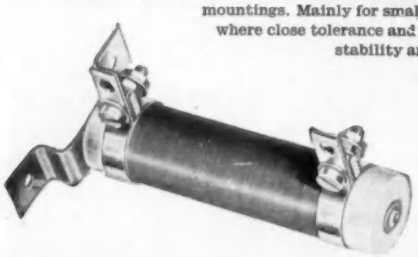
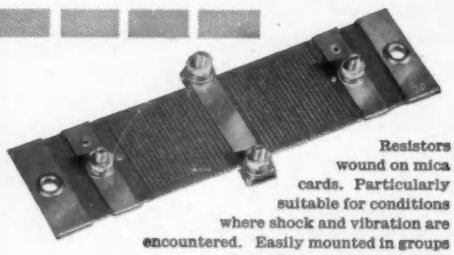


Wire-wound porcelain resistors with a variety of mountings. Mainly for small loadings where close tolerance and electrical stability are needed.





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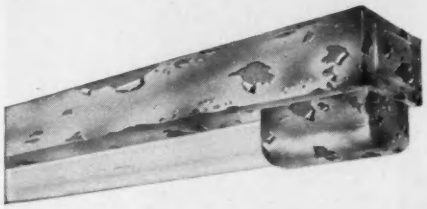

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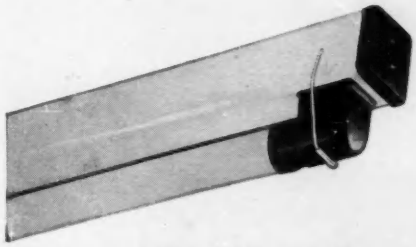

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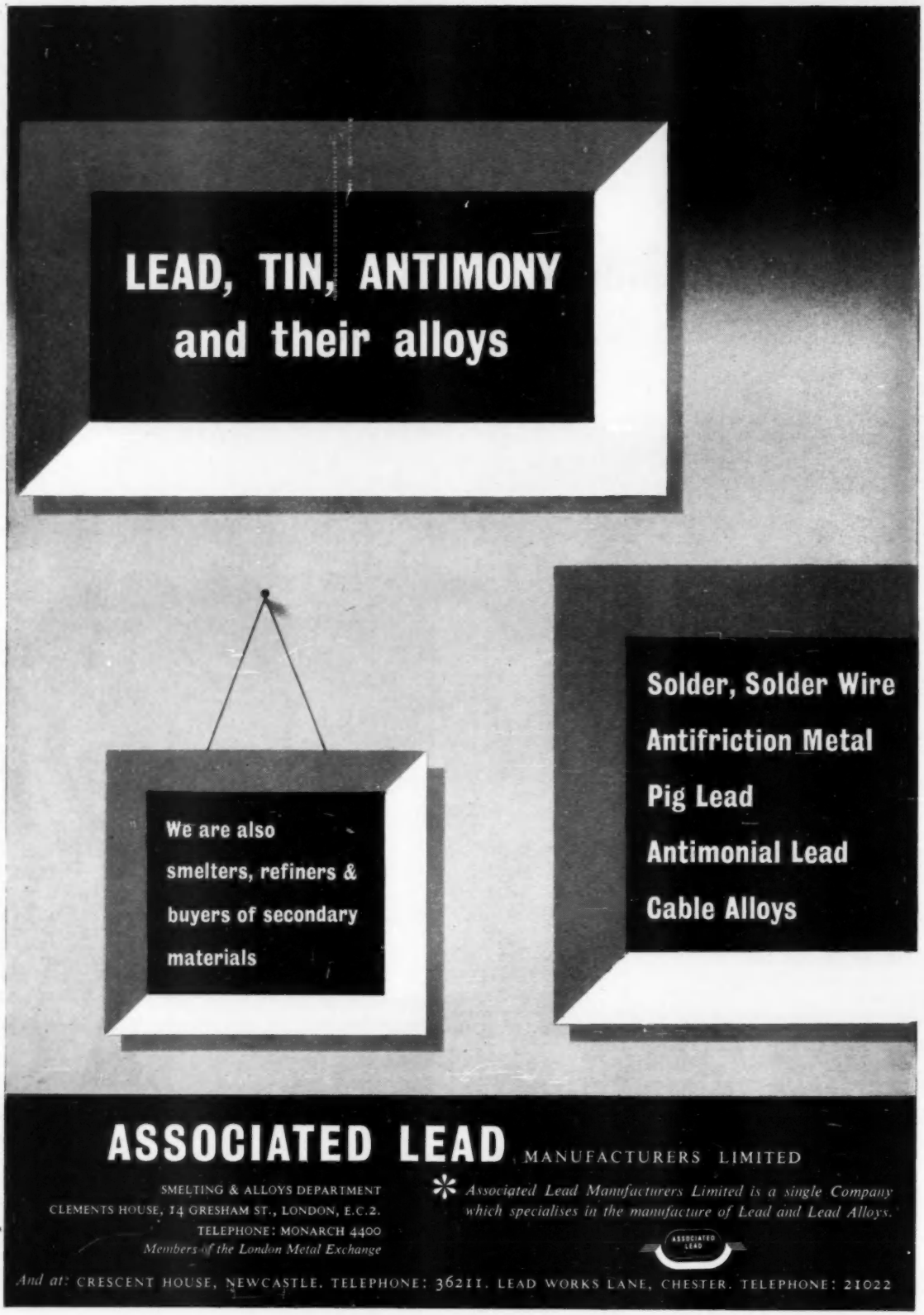

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That was when the Spencer stage ran
Past all record speeds.
Flying thundering hooves drew near,
Our nags collapsed with fright.
The coachman's rising shriek of fear
Dissolved into the night.
A thousand deaths we must have died —
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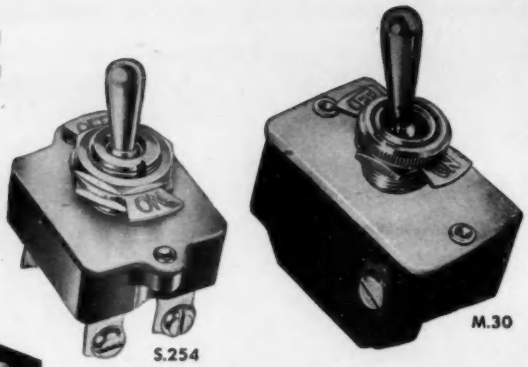
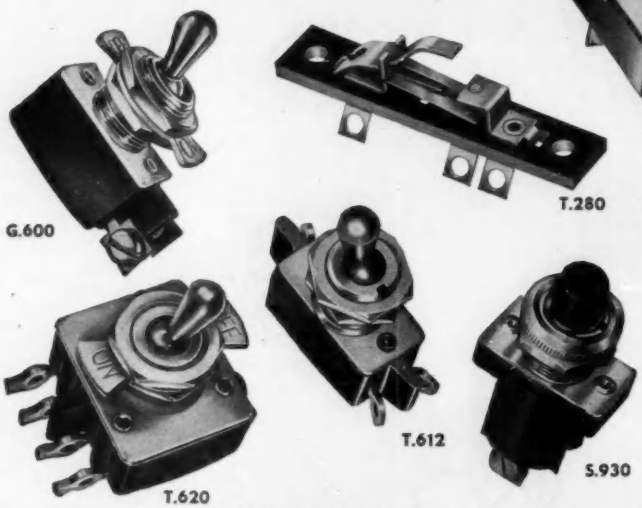


S.254 M.30



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M.30	10-AMP switch for electric fires
S.254	Double pole 10-AMP switch, A.C. only
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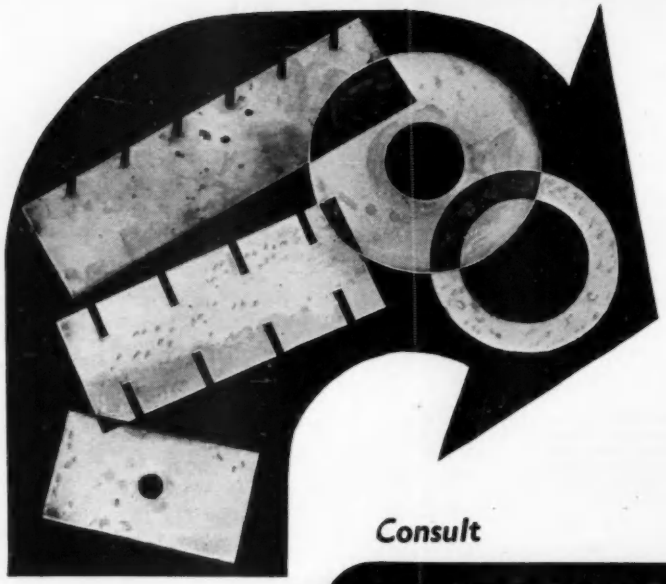

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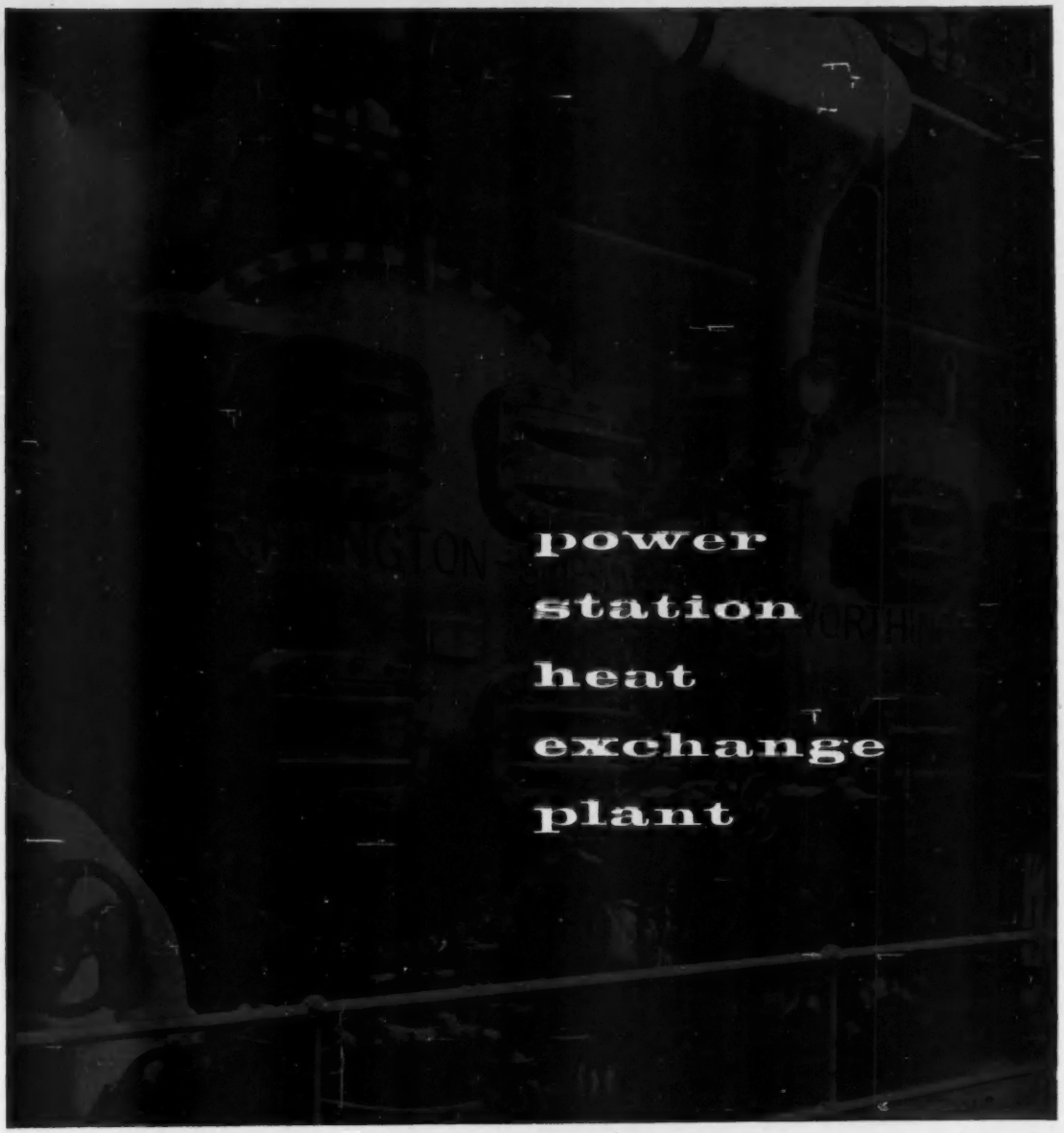

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1859 Malta–Alexandria Telegraph Cable Consultants for the British Government.

1863 Indo-European Telegraph Operation. Open Wire Line 2,750 miles long, including three submarine cables.

1873 Gutta Percha Submarine Telegraph Cable made for Platino Brazileira Telegraph Co. 1,129 Nautical Miles, Rio-de-Janeiro–Montevideo.

1874 Atlantic Telegraph Cable made and laid by Cable Ship Faraday I for Direct United States Cable Co. 3,112 Nautical Miles.

1891 First Cross-Channel Gutta Percha Telephone Cable. St. Margarets Bay to Sangatte (French Coast) for first telephone circuits between London and Paris.

1895 Telegraph Cable laid up the River Amazon for Amazon Telegraph Co. 1,639 Nautical Miles.

1903 Multiple Twin Paper-Insulated Telephone Cable made containing 1212/10 lb. conductors.

1908 Composite Multiple-Twin Telephone-Telegraph underground cable made for Western Trunk Lines to South Wales, 3.66 inch diameter.

1910 First Coil Loaded G.P. Telephone Cable. Anglo-French across the English Channel.

1911 First Balata Insulated Coil Loaded Telephone Cable. Anglo-Belgian Cross Channel.

1913 First Coil Loaded Multiple-Twin Trunk Telephone Cable laid in Manchester area.

1926 *Pacific Cable*

1919 Continuously Loaded Balata Submarine Telephone Cable, Norway.

1923 Cable Ship Faraday II in operation. Cable laying, New York–Canso, 1000 Nautical Miles.

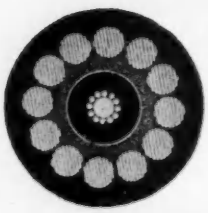
1924 First Anglo-Dutch Continuously Loaded Paper Insulated Telephone Cable.

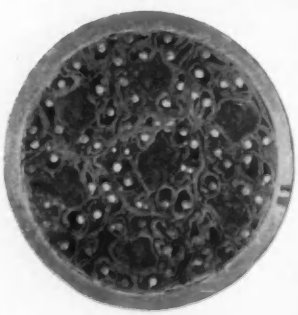
1926 Continuously Loaded Pacific Telegraph Cable for the "All Red Cable Route," Fanning Island–Suva.

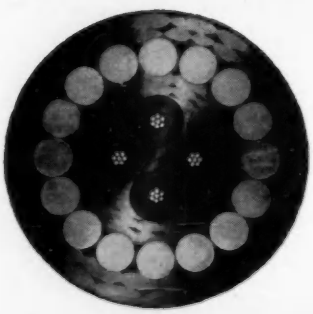
Right : Early Atlantic Telegraph Cable

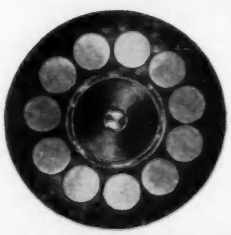
Below : Early Type Multiple-Twin Telephone Cable

Below right : 1891 Anglo French Submarine Telephone Cable







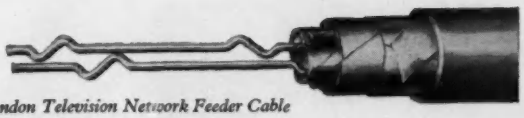


1935 *Bass Straits Submarine Cable*

EDISON SWAN

From the early gutta percha covered telegraph cable of one hundred years ago to the modern multi-channel cables for telephony and for television transmission, the name of Siemens has been intimately associated with many important advances in telecommunications.

Today it is linked with two other famous names in the electrical industry. The combination of Siemens Edison Swan marks the start of a new era in which this great enterprise, with its wealth of experience, can look forward with added confidence to making even more important contributions in the future.



Above : 1937 *London Television Network Feeder Cable*

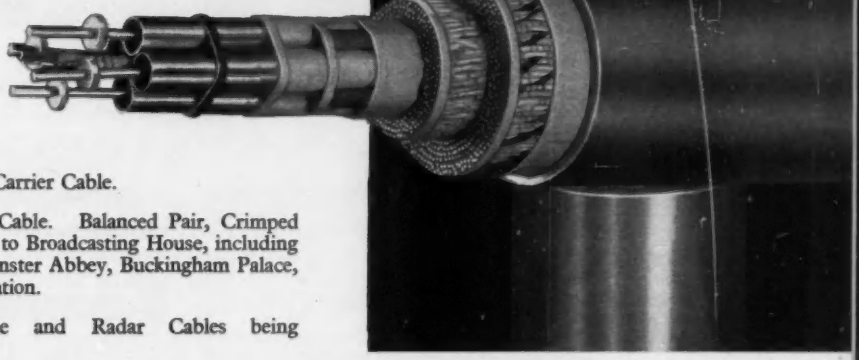
Below : 1936 *Type Carrier Cable*

1929 First Submarine Telephone Cable laid to the Isle of Man.

1935 Paragutta Submarine Co-axial Telephone Cable for carrier work. Bass Straits, Tasmania.

Long Distance Co-axial Cable with surrounding audio quads

Vertical illustration : Modern Type of Paper Insulated Distribution Cable



1936 London–Oxford, 12 Channel Carrier Cable.

1937 London Television Network Cable. Balanced Pair, Crimped Conductor. Alexandra Palace to Broadcasting House, including Houses of Parliament, Westminster Abbey, Buckingham Palace, St. James's Palace, Victoria Station.

1942 Plastic Insulated Telephone and Radar Cables being manufactured.

1949 First Sealed Tube Co-axial Cable for wide band carrier and television transmission.

1950 All-Plastic Telephone Type Cable manufactured up to 252 pairs and 3¼ inch diameter.

1956 First Atlantic Telephone Cable made by Submarine Cables Ltd., jointly owned by Siemens Edison Swan Ltd. and The Telegraph Construction and Maintenance Co. Ltd.

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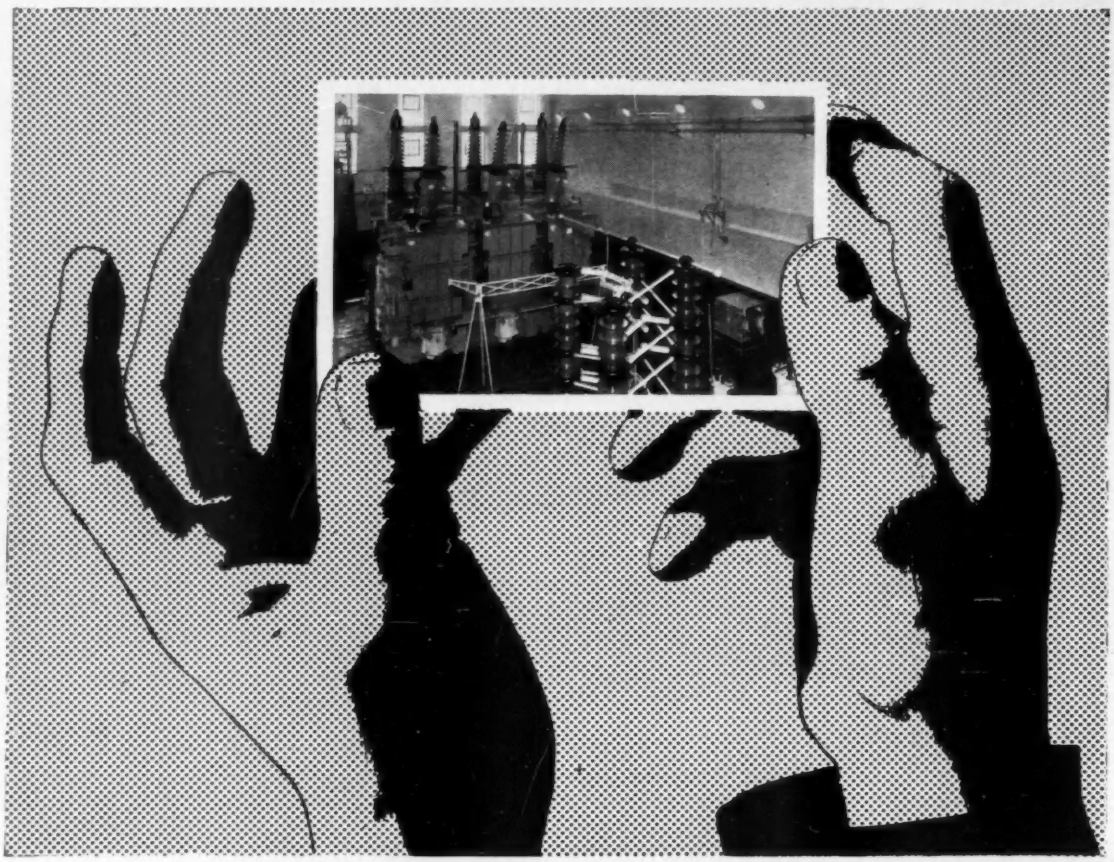
For the shock



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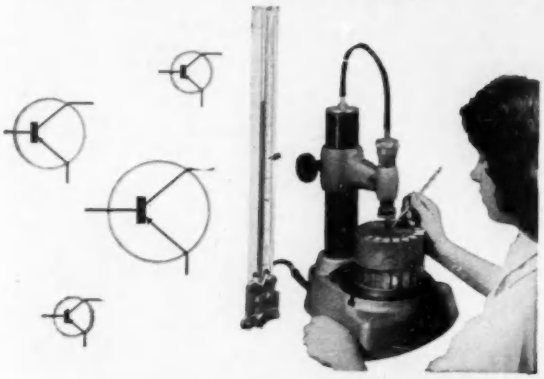
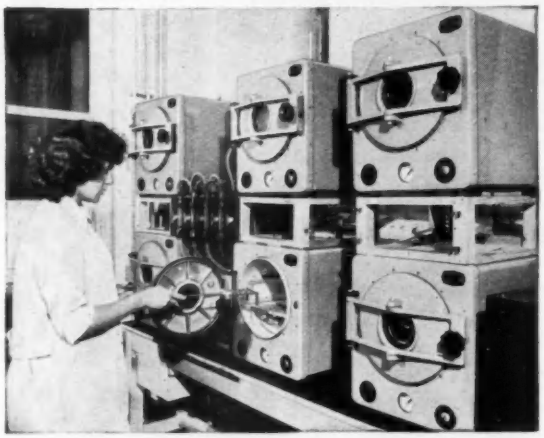


transistor manufacture

In the manufacture of transistors, Siemens Edison Swan Limited use a Birlec direct dehumidifier to maintain dry, dust-free conditions for the preparation and final assembly of germanium wafers. Maintaining 10% relative humidity conditions, the direct dehumidifier ensures accurate grading of the wafers according to thickness, and perfect electrical contact between the wafers forming emitter, base, and collector in the transistor.

Above: Grading germanium wafers prior to assembling into transistors

Below: Drying germanium wafers in vacuum ovens



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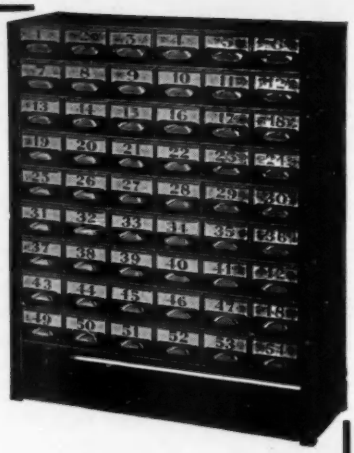

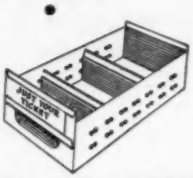

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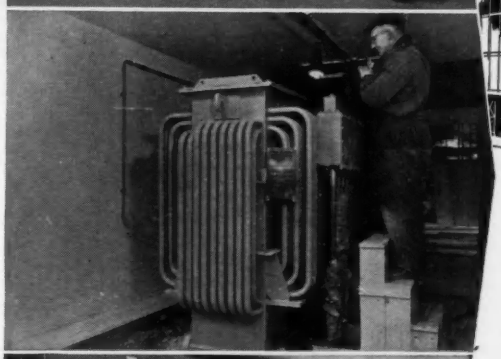

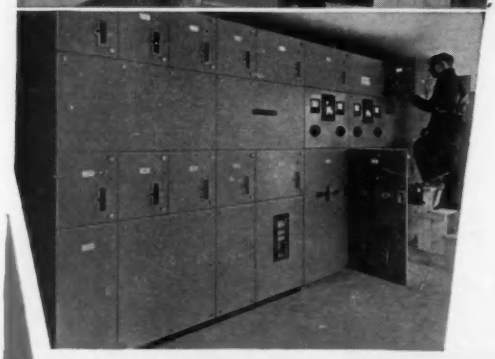

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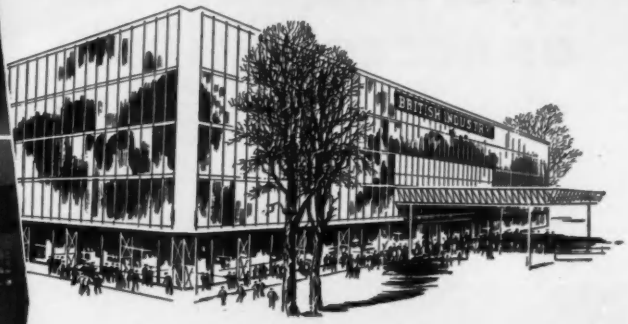

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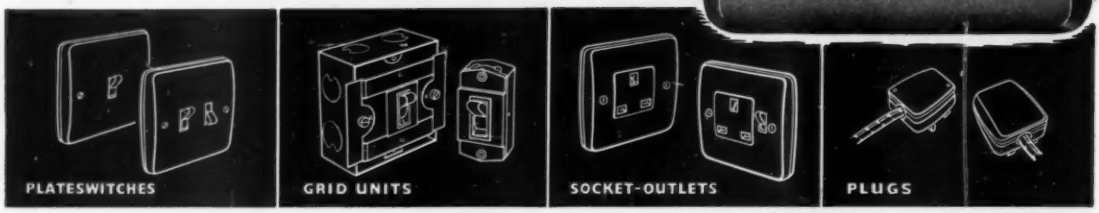

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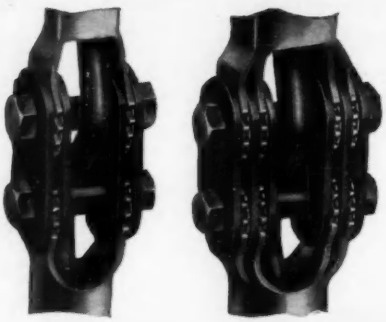

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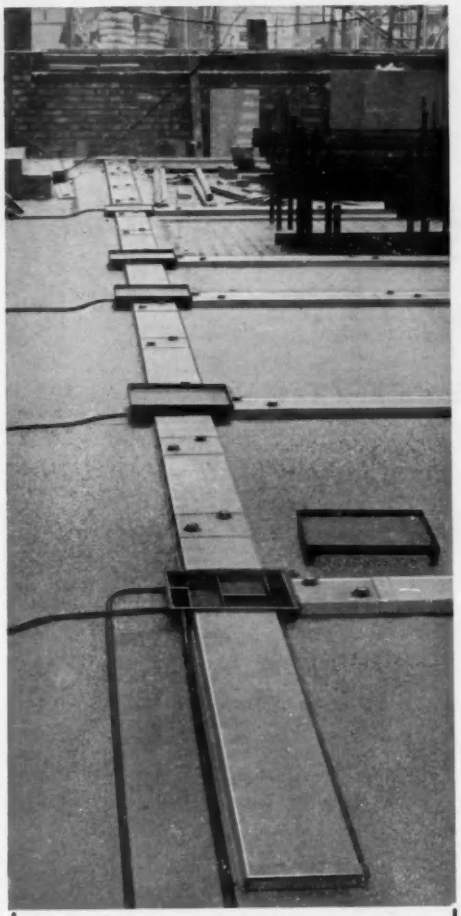

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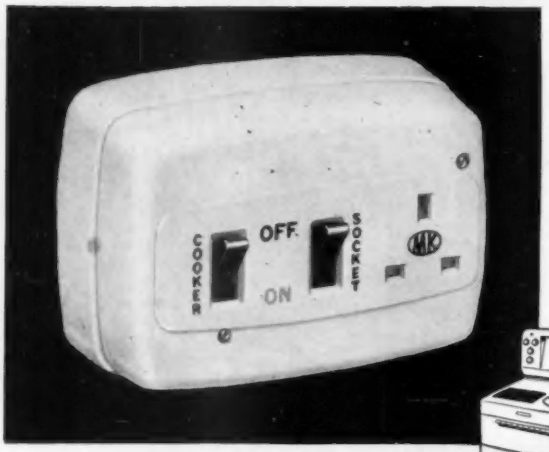

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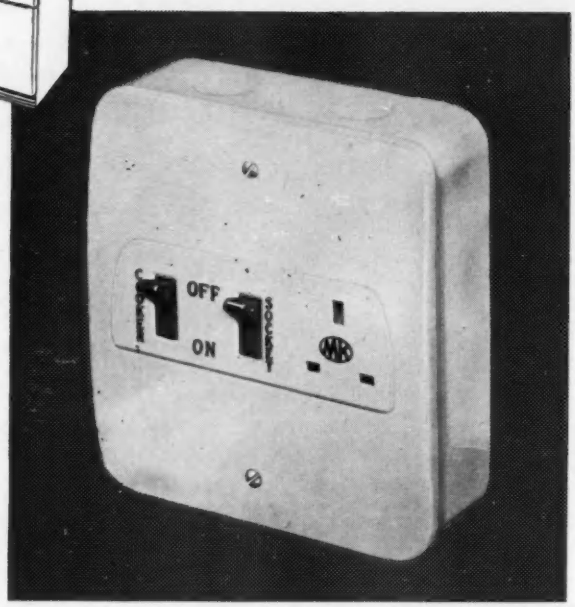

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4 JULY
1958

ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E. *General Editor:* J. H. COSENS *Technical Editor:* P. W. TUCKER, M.I.E.E.

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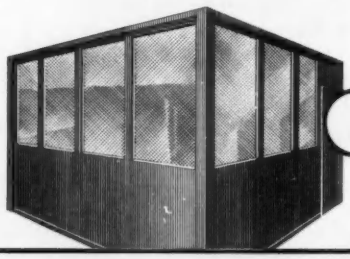

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ELECTRICAL REVIEW

4 July 1958 Vol. 163 No. 1 Established 1872

Hydro-Electric Generation

THE capacity of the St. Fillans section of the Breadalbane project, which is described in this issue, revives attention to the question of whether the high capital cost of hydro-electric generation of the small Scottish schemes is really justified, particularly with the advent of nuclear energy. One of the advantages of hydro-electric generation is, of course, that in spite of the greater capital expenditure the running costs are low. The cost of production of hydro-electric power per unit is about 0·59d whereas the cost of steam-produced electricity is about 0·86d (including capital charges).

To keep pace with coal requirements for steam stations further mining development is necessary and this may be presumed to add to the actual cost of thermal stations as compared with hydro schemes. Hydro-electric production, therefore, not only saves coal but should also reduce the amount of capital required for coal mining.

The Scottish hydro-electric schemes enable the number of small industries throughout the Highlands to be increased. The "rehabilitation" of the Highlands was a primary object in setting up the North of Scotland Hydro-Electric Board. In fact, industrial loads build up near the hydro stations, a very economic arrangement.

The construction of hydro-electric schemes has also brought more money to the Highlands in the form of wages paid by the contractors. This does not end here: it is a continuing process as, even after the contractors have left the site, the completed schemes and access roads have added to the tourist trade. Another important contribution is that most of the generating plant and equipment has come from factories in Scotland and, as a result, these firms have been able to enlarge and engage more competitively in similar work abroad.

The Scottish hydro-electric schemes are mainly one-machine stations, to simplify control, and most of the projects are of the water storage type as distinct from run-of-river. The water storage type are, of course, eminently suitable for peak-load operation whereas nuclear generation is essentially of a base-load character. Large steam turbines of 60 MW and more operate most efficiently on a 24-hour basis. It would therefore appear that water storage hydro-electric schemes will be useful in the future as a means of meeting peak loads.

As well as meeting peak loads during the day, hydro-electric schemes provide a convenient method of storing excess power from large steam and nuclear plants in the form of pumped storage. No other practicable method is available to accomplish this storage of energy. The large pumped storage scheme to be carried out at Ffestiniog is a good example of this. It will operate in conjunction with the Trawsfynnyd nuclear plant. Thus instead of there being a conflict between nuclear and hydro stations, they would appear to be complementary.

NUCLEAR STATION EFFICIENCY

In last week's leading article we suggested that the Government's decision to use the new nuclear power stations as a source of plutonium for military purposes would have an adverse effect upon the efficiency of those stations and the cost of electricity from them. After this had gone to press Mr. R. Maudling, Paymaster General, stated in the House of Commons that the modifications which would be necessary would not in any way impair the efficiency of the stations. Moreover, as the initial capital cost and any additional operating costs that might be incurred would be borne by the Government, the price of electricity would not be affected.

We are bound to accept Mr. Maudling's assurance regarding the efficiency of the stations although we suspect that he may have been referring to operational rather than thermal efficiency. It is, of course, only just that the extra financial burden should be borne not by electricity consumers but by the Exchequer.

CONSULTANTS AND NUCLEAR POWER

Concern is expressed in the annual report of the Association of Consulting Engineers (summarised on page 10) regarding their participation in the nuclear power station programme. There is an impression that the young engineers employed by consulting firms are not so conversant with practical matters as those employed by the nuclear consortia. Many have, however, attended regular courses on nuclear engineering and are as well qualified as industrial engineers. Consulting engineers are now gaining experience in the new science and the Association hopes that more use will be made of the services of its members in the design and construction of nuclear power stations.

Although the industrial consortia can give consulting advice, it is necessarily confined to their own designs. On the other hand consulting engineers are equipped to advise on the relative merits of various designs and can therefore offer impartial advice to clients. They also have the necessary contacts and qualifications for advising potential overseas customers of the British nuclear engineering industry.

INDUSTRIAL TRENDS

A somewhat mixed picture has resulted from a second inquiry into industrial trends made by the Federation of British Industries. Three main questions were put to 850 member firms of whom 554 replied in the time allowed. They were first asked whether they felt more or less optimistic about the general business situation; about half of them saw no difference but of the rest 31 per cent were less optimistic. About 60 per cent, replying to the second question, found labour more easy to obtain now than three months ago and 39 per cent reported "no change." To the third question, whether authorisations of capital expenditure in 1958 would be greater or less than in 1957, roughly half said "less" both for buildings and for plant and machinery; 28-29 per cent expected no change and 18-23 per cent looked for a greater amount.

Firms were also asked to compare a number of factors with the position three months ago and from the answers it seems that while there was a substantial number reporting no change the majority of the rest came down on the "pessimistic" side, i.e., lower average weekly working hours, fewer employed, smaller order books, lower output, lower raw material stocks, lower selling prices and (more than half) smaller profit margins. The F.B.I. sums up as follows:—

> "On balance businessmen appear rather less optimistic than they were three months ago. Nevertheless the percentage of firms recording an increase in both home and export deliveries and in the rate of new orders is encouraging."

CAPITAL FROM REVENUE

Following the Government policy, the nationalised industries of this country are fixing their prices so as to include partial provision for capital expenditure. The 1956-57 report of the Central Electricity Authority showed that although there had been delay in providing for a greater degree of self-financing of future capital programmes the Authority and Area Boards were still able to meet some two-fifths of their capital requirements from "internal resources."

On the other hand the New Zealand Government seems to be moving away from this policy—at any rate temporarily. A study is being made of a plan for the development of the country's electrical resources and the method of financing it authorised by legislation passed last year. The Minister in charge of the State Hydro-Electric Department (Mr. Watt) recently said that it had been decided to make an interim amendment of the financial provisions for one year. The Government's plan was to so reduce the bulk price of electricity as to remove the obligation to charge an extra amount for capital purposes; the saving would be passed on to the domestic consumers.

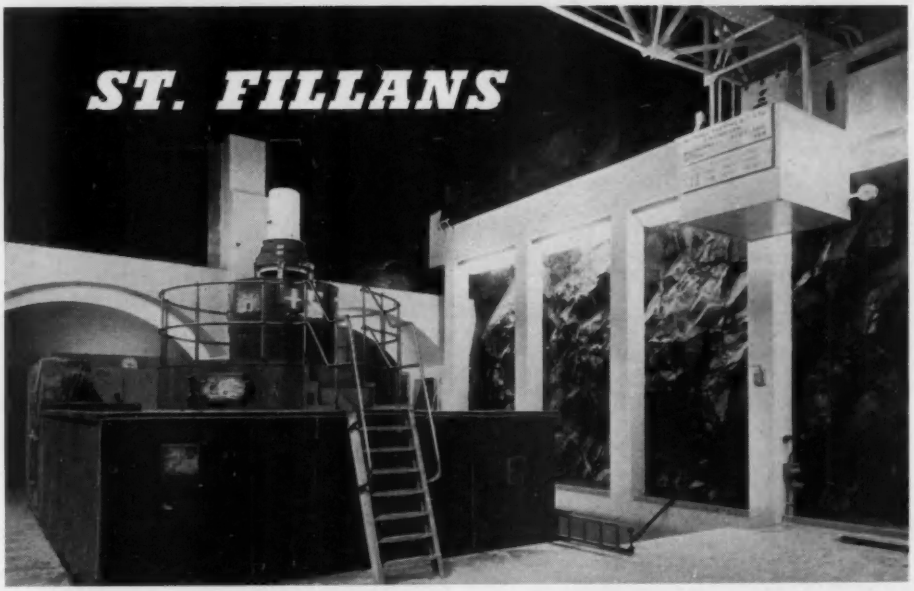
CALDER HALL ACCIDENT

It is serious enough when a mishap occurs to a turbo-generator in a "conventional" station but when, as was the case last Saturday, the machine is in a nuclear station there are bound to be misunderstandings of the nature of the accident and its effects. There is, of course, no question of danger from radioactivity in this instance, but in spite of the stress laid upon this in a statement by the Atomic Energy Authority, it will be hard to completely convince the public and there is a risk of misleading reports being propagated abroad.

The second half of the Calder Hall station was shortly to be commissioned. Some time must now elapse before the damage can be made good, which is most unfortunate at a time when all the operational experience possible is needed.

"ELECTRICAL WHO'S WHO"

The fifth edition of the "Electrical Who's Who" is now available. Its nearly 8,000 entries cover all branches of the electrical industry and profession. Copies are obtainable at 27s 6d (postage 1s 6d) from Electrical Review Publications, Ltd., Dorset House, Stamford Street, London, S.E.1, or from booksellers



Opening of Part of the Breadalbane Hydro-Electric Project

THE Breadalbane hydro-electric scheme of the North of Scotland Hydro-Electric Board consists of the Killin, St. Fillans and Luib sections with a total catchment area of 202 sq miles. Work on the first two sections is nearing completion—the Luib section has not yet been started—and last Saturday the St. Fillans underground power station was officially opened by Lord Bilsland of Kinrara, formerly chairman of the Scottish Council (Development and Industry).

In the St. Fillans section, which is about 60 miles north-west of Edinburgh, there are two dams, about 27 miles of tunnels and aqueducts and three power stations, which in order of the use of the water are Lednock, St. Fillans and Dalchonzie respectively. Construction of the scheme began in 1953 and St. Fillans power station came into operation on 24th December, 1957. Dalchonzie power station is now being commissioned and the installation of machinery at Lednock should commence in the autumn.

The catchment area of the section is about 91 sq miles with an average annual rainfall of about 70in. Part of this area is shown in the accompanying map. Water from Loch Breaclaich, which has been raised in height by a rock-fill dam, passes through Lednock power station into the new Loch Lednock reservoir formed by a buttress dam across the river. The water from Lednock reservoir, together with substantial diversions from hill streams, is led into Loch Earn via St. Fillans power station. A weir has been built at the outlet of Loch Earn to control the flow of the River Earn. Part of the water from the loch is diverted at the weir via a tunnel to Dalchonzie power station which is situated three miles downstream of, and discharges into, the River Earn.

The total capacity of the St. Fillans section is 28 MW. With an average annual rainfall, St. Fillans will operate at a 42 per cent load factor and Dalchonzie at 50 per cent.

In addition to bringing "power to the Highlands," the operation of both Loch Earn and Lednock reservoir will give a measure of flood control. Fish passes have been built at the weirs on both the Rivers Almond and Earn and the Board have agreed that sufficient water will be passed down these rivers to maintain fish life and meet public health requirements. A similar obligation has been met at Lednock River by discharging water through the dam.

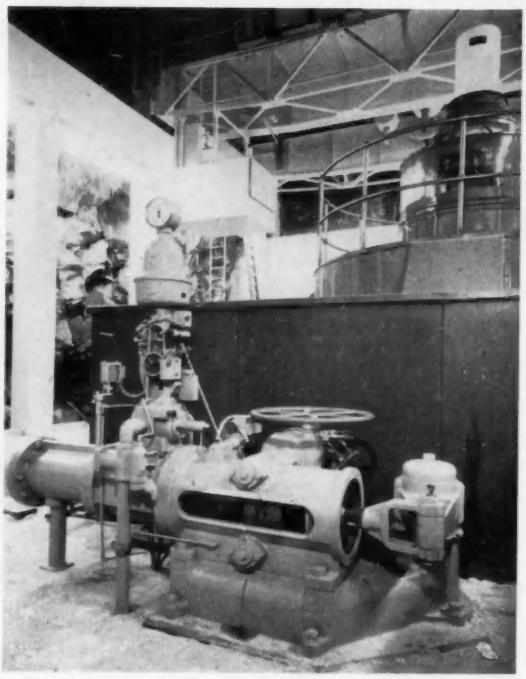
The title picture shows St. Fillans underground power station with its 21 MW alternator and bare rock wall

Excavation Work

St. Fillans power station has been carved out of the solid rock, mainly for amenity purposes, at about the same cost as a surface station. The entrance to the station, which is framed in stone from local quarries, is through a 200ft long tunnel with a gentle downward incline. Approximately 40,000 tons of rock was excavated to form the power station and the spoil from the station and the tunnels has been used by Perth County Council to widen the Loch Earn side road. The station contains one 21 MW water-turbine alternator unit, the turbine being manufactured by the Harland Engineering Co., Ltd., and the alternator by Bruce Peebles & Co., Ltd. The underground excavation can be considered as two floors, the lower floor allowing access to the turbine and main inlet valve and the upper floor containing the alternator, governor, control cubicles and switchgear. The upper floor turbine hall is 96ft long by 34ft wide by 40ft high. The roof and the two end walls are reinforced with concrete, but the virgin rock is left exposed along the two side walls. Daylight fluorescent fittings are used for the main illumination with indirect lighting in the alcoves. The travelling crane has a capacity of 60 tons.

The vertical shaft water turbine has a rated output of

Main inlet valve at St. Fillans



Combined governor and oil servo-motor

30,000 h.p. at 785ft net head when running at 600 r.p.m. The single Francis runner and the wicket gates are all of cast stainless steel construction, but most of the remaining items, including the spiral casing assembly, are of fabricated mild steel, the more important members where necessary being stress-relieved. The main turbine inlet "Roto" valve is solenoid controlled with its hydraulically-operated servo-motor fed from the pressure penstock.

Automatic devices are provided in the governor system for stopping and starting the machine. The governor pendulum is driven by a synchronous motor supplied by a permanent magnet generator which is directly coupled to the alternator shaft above the exciters. A servo-motor, which is oil operated at 210 p.s.i. and controlled by the governor, is situated on the upper floor and operates the turbine regulator ring by an 18ft vertical shaft and linkage.

Auxiliaries comprise a governor oil pumping set, two station drainage pump equipments and two cooling water pumping units; this last auxiliary also serves as the de-watering unit when the penstock and tail-race system has to be drained. The high station head of 785ft has only a short penstock system owing to the steeply sloping terrain in this area. This has meant that the surge shaft is quite close to the turbine unit and hence by accepting a slightly increased pressure regulation figure it was possible to dispense with the pressure relief valve. This led to a saving in excavation costs particularly since the station is underground.

The vertical shaft synchronous generator has a rated output of 21 MW at 11 kV and 0·85 power factor. This salient-pole machine has a totally enclosed air circuit and is water cooled. Provision has been made for bleeding-off air to heat the station and a filter screen has been included for make-up purposes.

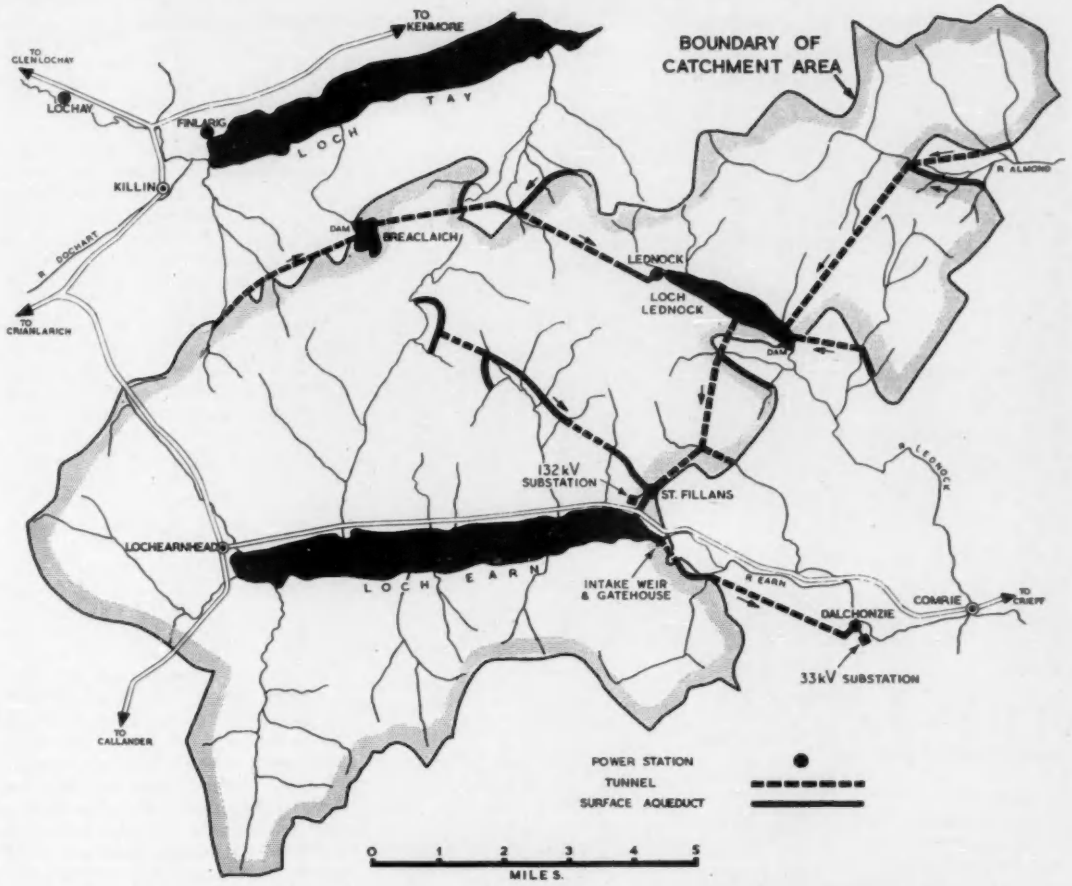
The main combined thrust and journal bearing for the unit is mounted on the upper bracket of the alternator and, along with the lower alternator guide bearing and the turbine guide bearing, they are of the oil-immersed self-lubricating type with integral water cooling coils. The total load supported is 80 tons.

Main and pilot exciters are provided, the latter item giving a source of d.c. for the motor amplidyne set of the magnetic amplifier voltage regulator. This results in a self-contained excitation system independent of any external a.c. supply.

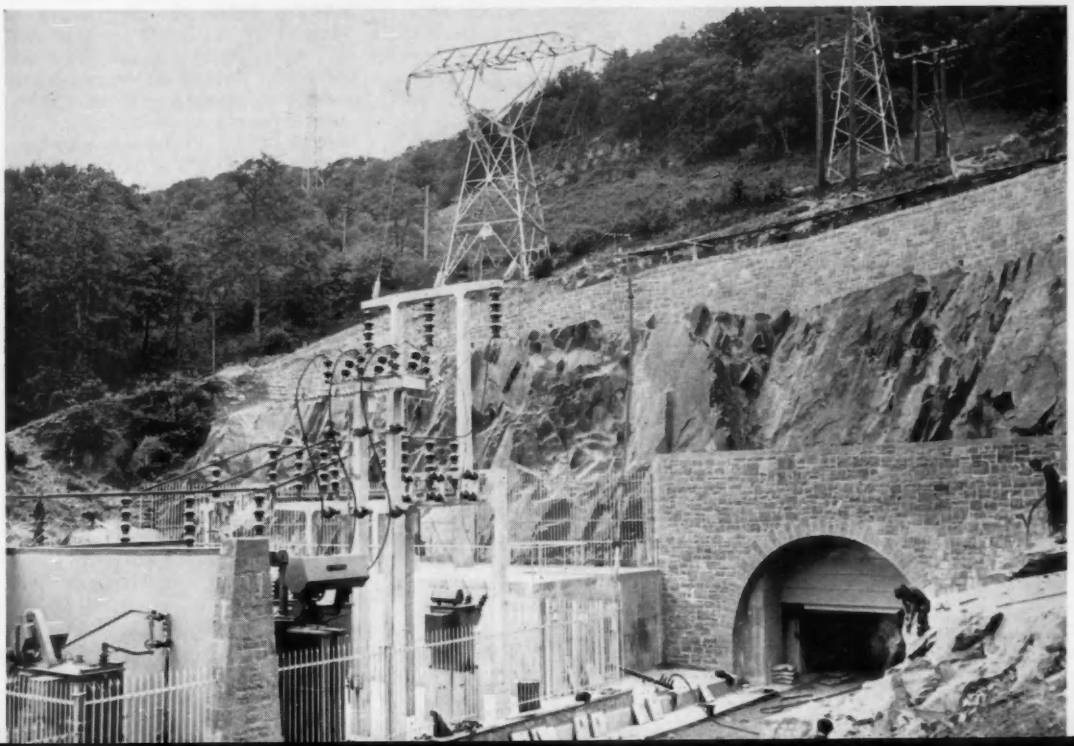
Air-Break Switchgear

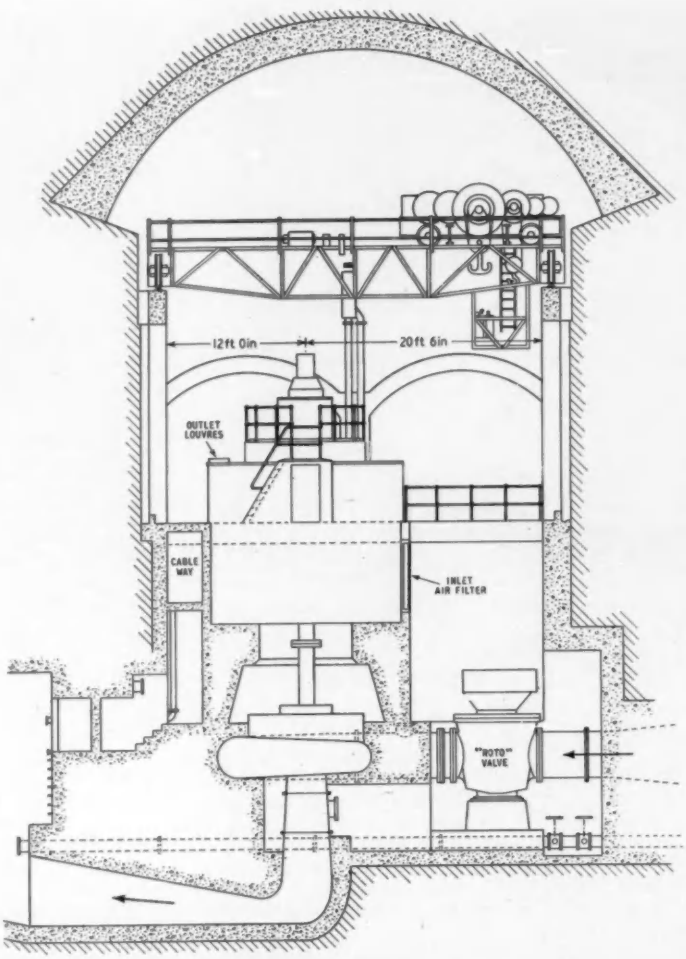
The alternator output is connected to a three-panel 11 kV switchboard. It was decided to place this switchgear in the underground station to avoid extra multi-core cabling and the additional cost and space required for outdoor equipment. To avoid explosive risk associated with oil-immersed switchgear, air circuit-breakers have been provided. Another advantage of this type of switchgear, a detailed description of which appeared in the *Electrical Review* of 7th June, 1957, is the ease of maintenance. The generator circuit-breaker is rated at 1,600 A, 500 MVA, and a frame leakage busbar protection system has been provided for the switchboard. The control panels for the turbine, generator, excitation system and auxiliaries are mounted as two suites on the upper station floor. From this control point the unit may be started up to "ready to synchronise" either electro-manually or entirely automatically by depressing a single start push-button. A comprehensive alarm and protection scheme is provided for the unit, covering both electrical and mechanical faults. The generator protection includes differential, overload, negative phase sequence and over-voltage devices.

The unit has been designed so that the alternator can run as a synchronous condenser. This involves provision

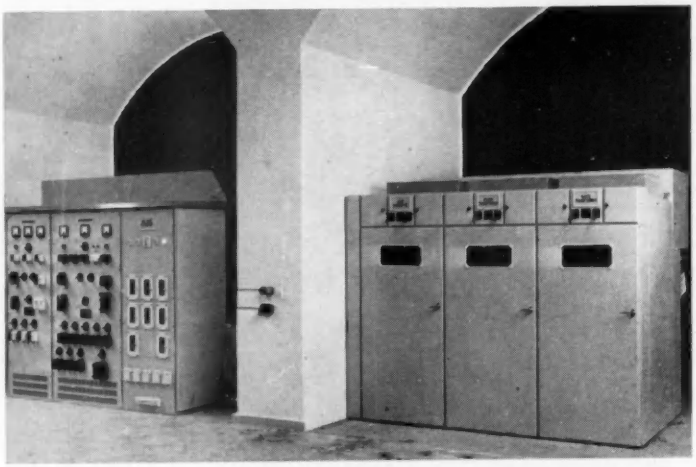


Above : Map of St. Fillans section of Breadalbane project and (below) entrance to St. Fillans power station with the transforming station at left





Section through St. Fillans power station



St. Fillans 11 kV air-break switchgear at right and battery chargers and bus-zone protection cubicle at left

for supplying cooling water to the turbine runner seals. When this feature is required, compressors will have to be installed to depress the water in the draft tube clear of the runner.

Since the station is underground, nickel-cadmium batteries have been supplied by Nife Batteries instead of the usual lead-acid type because of the smaller space required.

The average annual output of St. Fillans is expected to be about 76 million kWh.

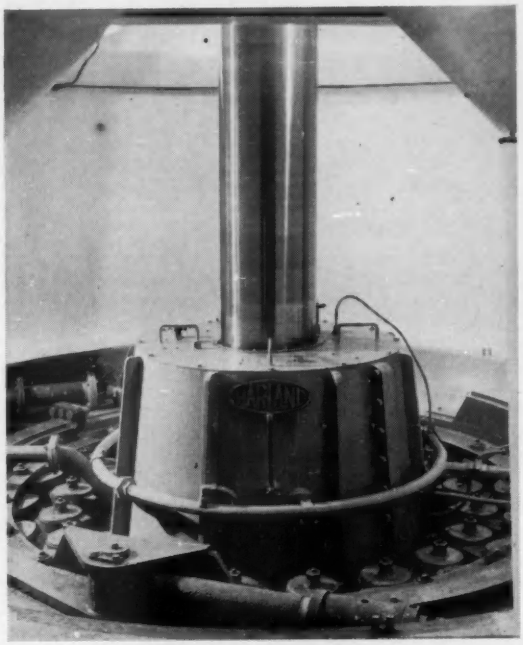
An interesting feature of Dalchonzie power station is that the 4 MW machine is an induction generator. The turbine is of Boving & Co., Ltd., manufacture and the alternator was made by Bruce Peebles. Vertical shaft arrangement of the turbine and generator has been adopted and there is a two-floor layout similar to St. Fillans.

Dalchonzie is a masonry built surface station with the interior walls lined with special fawn facing bricks of Scottish manufacture. The operating floor is 40ft by 29ft. To reduce the size of the building the main inlet valve is housed in a pit outside the station.

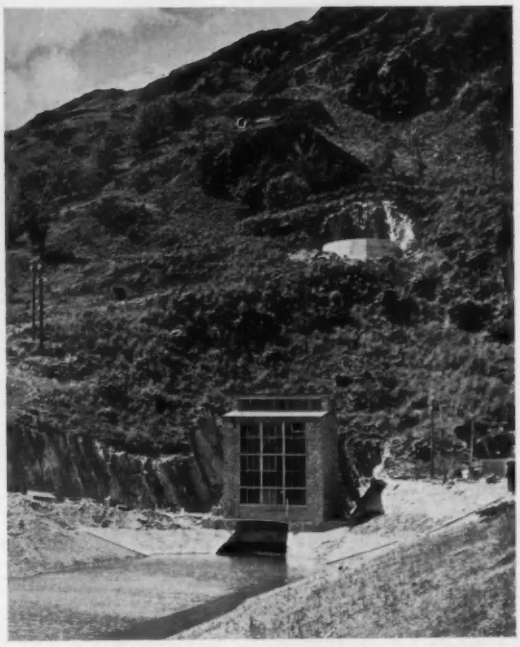
Since the Dalchonzie plant will have to operate over a wide range of load, an adjustable blade Kaplan water turbine has been installed. This axial flow turbine is rated at 5,600 h.p. at a net head of 86ft for a synchronous speed of 333 r.p.m. The general construction includes cast stainless steel runner blades, forged steel shaft and fabricated mild steel spiral casing and the turbine main inlet valve is, in this case, an 8ft bore butterfly valve. A conventional speed sensitive governor has not been provided since the machine is an induction generator. The automatic run-up scheme allows the guide vanes to be opened to the break-away position. When rotation commences the vanes are closed and then re-opened to the speed no load. At this stage speed matching is controlled by a frequency sensitive relay which closes the generator circuit-breaker when the set is running at the correct speed. The position of the guide vanes is adjusted by an oil servo-motor. A motor-operated setting valve controls this servo-motor for load adjustment.

The induction generator, although of normal construction, is one of the largest size induction machines commissioned in this country. Its rating is 4 MW at 3·3 kV with a leading power factor of 0·89 when running at a load speed of 336 r.p.m. Open air-cooling is provided for the alternator while the self-lubricating bearings derive their cooling from the pressure intake.

The turbo-generator unit at Dal-



St. Fillans turbine steady bearing showing turbine regulating ring and operating rods



Dalchonzie power station showing top of surge shaft and tail race

chonzie is controlled and loaded by a push-button system at St. Fillans power station. Run-up of the machine and synchronising on to the 33 kV system is entirely automatic. Control of the 33 kV outdoor circuit-breakers in the adjacent substation can be either from St. Fillans or the control board in Dalchonzie.

The average annual output from Dalchonzie is expected to be about 18 million kWh.

The masonry-built Lednock surface power station will contain a horizontal 3 MW induction generator with a Francis water turbine. The unit will be automatically run up and loaded to a pre-set load for two separate periods during the day by a time switch system. The timing control at Lednock is designed to be overridden from St. Fillans power station when necessary. The run-up and synchronising governor system will be similar to that at Dalchonzie but less complicated since the machine at Lednock is a Francis turbine. The catchment area for Lednock is 7·6 sq miles and the average annual output is expected to be about 5 million kWh.

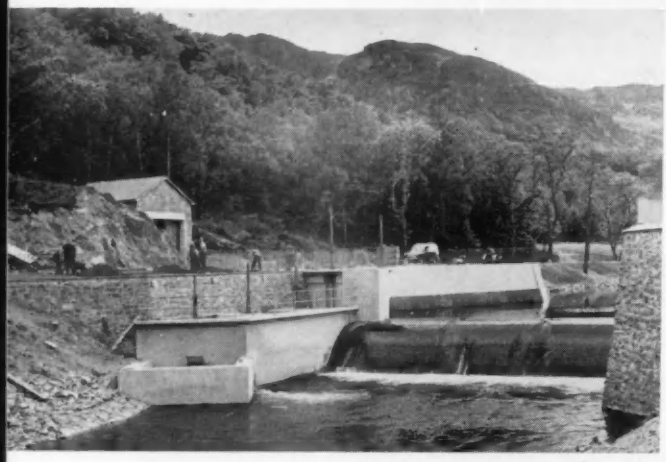
The diamond-headed buttress dam at Lednock is 950ft long and 130ft high and the level of the water in the glen will be raised by 110ft. The operating variation of the water in Lednock reservoir is expected to be about 85ft. The headstocks and screen lifting gear at the dam are electrically operated at 415 V. At the Dalchonzie intake and the Loch Earn weir there are electrically-operated gates. The Loch Earn level is electrically transmitted to St. Fillans and the level of Lednock reservoir will also be displayed at St. Fillans.

The main transmission system comprises a single circuit strung on double-circuit 132 kV towers from Killin switching station to a Bruce Peebles 25 MVA, 132/11 kV transformer outside the entrance to St. Fillans. The l.v. side of this transformer is connected to the 11 kV busbars within the underground power station. For construction purposes, the 132 kV lines were used to carry power at 33 kV.

The smaller units at Lednock and Dalchonzie are connected into the local Crieff 33 kV distribution system which supplies the surrounding countryside and is also connected via a Bonar Long 5 MVA, 33/11 kV reinforcement transformer to the 11 kV busbars at St. Fillans.

Protection and remote line isolation is performed by a

Dalchonzie induction generator under construction. Part of m.g. set used for drying out the windings can be seen at the lower left



Weir at the outlet of Loch Earn. The fish pass is shown in the left foreground with the Dalchonzie intake on the other side of the weir. The intake gate house is on the left

132 kV fault-throwing switch in place of the more expensive pilot scheme. For the main transformer at St. Fillans, equipment has been provided to give differential, overload, earth fault and Buchholz protection.

Supervisory Operation

The unit at Dalchonzie power station is, as already mentioned, an induction generator and is provided with facilities for remote supervisory control from St. Fillans. Indication of power generated, current, voltage and machine speed of this small unit is telemetered by pilot cable to St. Fillans, and supervisory operation is by means of telephone-type coded signals. Essential alarms are transmitted over the same channel. The total output of all three power stations is transmitted from the respective wattmeters to the Group Control Centre at Killin by means of impulse signals over the interconnecting Post Office telephone channel. The control system for Lednock will be similar but fewer indications will be brought back to St. Fillans.

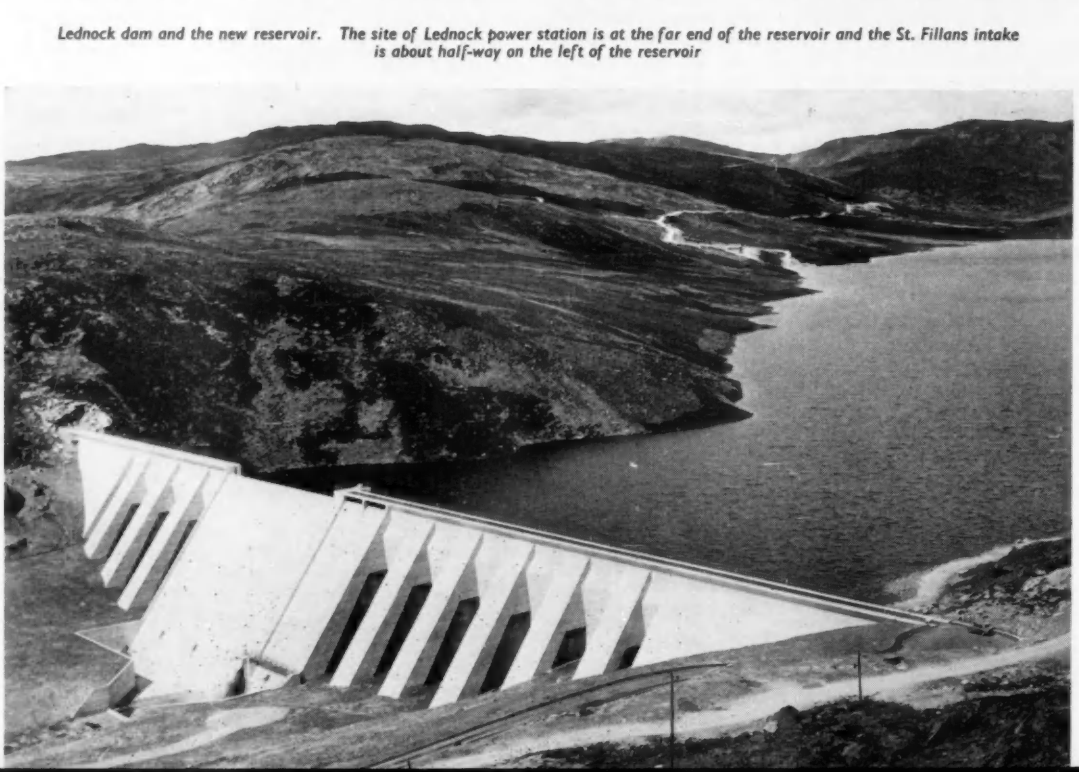
The complete St. Fillans section can be operated by one attendant at St. Fillans power station. As well as controlling St. Fillans, this attendant will operate Dalchonzie remotely while, for normal operation, Lednock will be time switch controlled. Loading instructions will be phoned to St. Fillans from Killin Group Control Centre.

Consultants and Contractors

The mechanical and electrical consulting engineers for St. Fillans and Dalchonzie power stations and the overhead line work are Messrs. Kennedy & Donkin, and Messrs. Strain & Robertson are responsible for Lednock power station. Sir Murdoch Macdonald & Partners are the civil consulting engineers for St. Fillans and Dalchonzie. The civil consultants for Lednock are Messrs. Duff & Geddes in association with Mr. R. H. Cuthbertson. Mr. Robert Hurd, B.A., F.R.I.A.S., is the architect for St. Fillans and Dalchonzie and Mr. Leslie Graham-MacDougall, R.S.A., F.R.I.B.A., P.P.R.I.A.S., is the architect for Lednock power station.

The main contractors for St. Fillans and Dalchonzie are:—Civil engineering works, Mitchell Construction Co., Ltd.; overhead line construction, Balfour, Beatty & Co., Ltd.; St. Fillans turbine, Harland Engineering Co., Ltd.; Dalchonzie turbine, Boving & Co., Ltd., and John Brown & Co., Ltd.; generators at both stations, Bruce Peebles & Co., Ltd.; 11 kV switchgear and 132 kV isolators, A. Reyrolle & Co., Ltd.; 33 kV switchgear, Cooke & Ferguson, Ltd.; 33 kV isolators and 132 kV fault-throwing switch, Switchgear & Equipment, Ltd.; cabling at St. Fillans, Pirelli-General Cable Works, Ltd., and cabling at Dalchonzie, British Insulated Callender's Cables, Ltd. At Lednock the main contractors are:—Civil engineering works, R. J. McLeod; turbine, Harland Engineering Co., Ltd.; generator, Bruce Peebles & Co., Ltd.; and 33 kV switchgear, Brush Electrical Engineering Co., Ltd. The supervisory control equipment for the whole scheme was supplied by the Automatic Telephone & Electric Co., Ltd.

Lednock dam and the new reservoir. The site of Lednock power station is at the far end of the reservoir and the St. Fillans intake is about half-way on the left of the reservoir



WASHING MACHINE PRODUCTION

Hoover Activities in South Wales

TEN years ago Hoover, Ltd., began operations in the Merthyr Tydfil (Glamorgan) area and there are now four factories of the group there—Pentrebach (268,000 sq ft), Aberdare (25,000 sq ft), Dowlais (107,000 sq ft) and Cyfarthfa (26,000 sq ft). It is claimed that the group is the largest in Europe devoted solely to washing machine manufacture; about 2,000 people are employed.

The Pentrebach factory of Hoover (Washing Machines), Ltd., is one of the most modern of its kind and is devoted to the manufacture of several basic types of washing machines, with variations to suit conditions in more than 50 countries throughout the world. In this factory the well-known "Hoovermatic" washing machine is produced and the success of the production programme is largely due to the use of mechanical handling and assembly techniques combined with close quality control. Mass production assembly methods are combined with a special test line where faults are tracked automatically to make certain that no machine can pass through without being 100 per cent sound, electrically and mechanically. The manufacturing process begins in the materials handling bay where the raw materials are received and despatched to various parts of the factory. There are four miles of conveyors and using these and other modern handling methods, the materials and components are quickly moved from section to section.

Manufacture and Assembly Processes

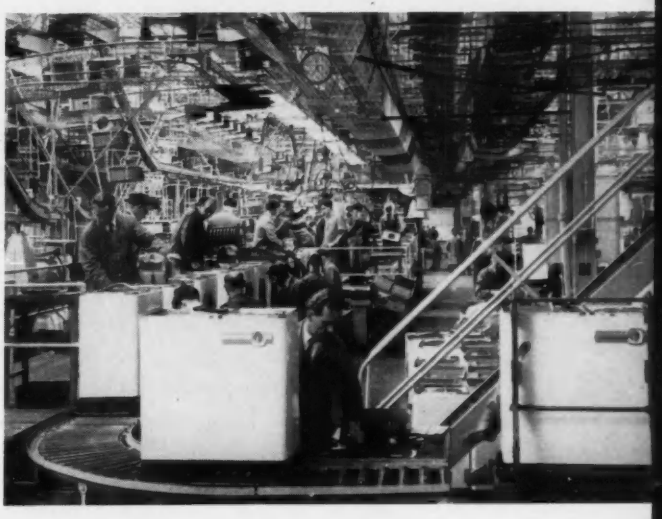
The cast-metal parts are made in a foundry equipped with hydraulic pressure die-casting machines and a rotary furnace, while from a battery of 200 ton semi-automatic presses come the plastic moulded parts, such as the pulsator and wheels. Strip steel for the outer casing is cut to size and formed on a rolling machine. Then, in two operations on tangent bending machines, the sides and front are further formed from the one sheet of metal, to which the storage compartment is then assembled and welded. Meanwhile the rear panel assembly is pressed and trimmed.

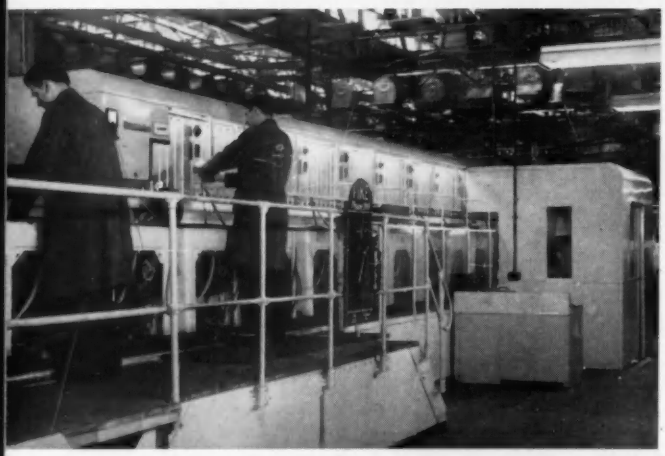
The inner stainless steel washing tubs go through similar operations of pressing, bending in power bending machines and welding. Similar processes are carried out for spin dryer parts. One of the biggest automatic anodising plants in Britain is employed to anodise the "table top" lid and other aluminium parts, thus giving them a durable smooth finish.

Furnaces in the heat treatment room are used to harden and temper the metals. Two coats of paint, a primer and an enamel, are applied to the outer shells and this is stoved in ovens to obtain a hard and glossy finish. Recently, an electrostatic painting plant has been installed to paint some components and this has halved both the labour and paint previously required.

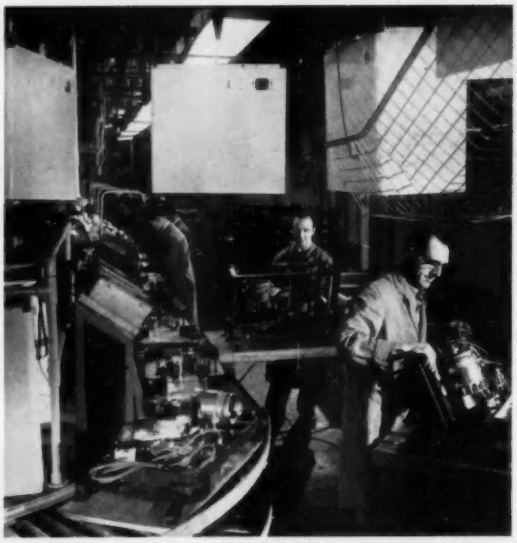
Smaller components are produced on multi-spindle lathes. The motors, which are made at the Hoover (Electric Motors), Ltd., Glasgow factory, and the other components are conveyed to the assembly section where they are built into a complete machine. Following normal flow production practice, the assembly work is broken down into a number of small jobs, including fitting

Final assembly of the "Hoovermatic" washing machine





The electrical test rig for the "Hoovermatic." On the right is the silence booth, enclosing the test console



Completed basic assemblies flow from this point to the main assembly line

and wiring the motors. The machines which make the component parts are nearly all electrically powered, many of them being Hoover designed. In the boiler room automatically fired boilers supply heat, steam and hot water both for domestic and industrial purposes. In an adjacent room a battery of electrically-operated compressors supply compressed air for operating hand tools and other industrial purposes in the factory,

In the nearby paint room, paint is stored and constantly mixed in large tanks whence it is pumped to the paint spraying booths about 500ft away. The factory has one of the best equipped toolrooms in South Wales, employing over 100 skilled toolmakers. Close to this is the recently-installed gear-cutting equipment. There are also laboratories for metallurgical and chemical research and investigation, and in these laboratories and throughout the factory quality control checks are constantly made to see that materials and products are of the highest standard.

One of the most interesting features of the new "Hoovermatic" production line is the continuously moving test section, which quickly and accurately, subjects each machine to thorough operating and electrical tests. This apparatus, which was designed by the company's designers, is fully automatic and records on central instrument panels any faults in the continuously moving lines of completed washing machines.

CONSULTING ENGINEERS

Concern Regarding Participation in Nuclear Design

THE report of the Council of the Association of Consulting Engineers for the year ended 30th April last states that the total membership is now 466. Appendices give details of work in hand and completed as well as investigations and reports carried out by members of the Association during the year. One example is the investigation and design of the Mangla Dam on the Jhelum River, Pakistan, for irrigation and the production of hydro-electric power, the estimated cost of the whole project being £50 million.

With regard to nuclear energy, the Association notes that the Central Electricity Generating Board has made a long-term agreement with the United Kingdom Atomic Energy Authority for advice on the design of the nuclear side of its new power stations. It has been informed that this arrangement provides no opportunity for members of the Association whose staff has received specialist training with the U.K.A.E.A. to participate in this work for the Board. Other electricity authorities in the United Kingdom are, however, finding it possible to make use of the services of members of the Association.

Most intending purchasers of nuclear power plants overseas are at present ill-fitted to judge the relative merits of the various offers which may be put before them by the groups or consortia concerned with nuclear work. The groups have maintained that they are able to give any consulting advice required to prospective purchasers, but overseas purchasers should realise that to judge the relative merits of rival claims they must have access to first-class independent technical advice.

The Association notes that in the case of the Agip Nucleare contract the U.K.A.E.A. themselves felt it necessary to offer limited consulting services to the purchaser, but it is hoped that this is a role which is not being perpetuated. This situation is still unresolved and representations are being made in the appropriate quarter. A member of the Association is, however, advising an Italian authority on a proposed nuclear power station.

Winfrith Heath Experimental Reactor

A report from Paris published in *The Times* states that a committee, presided over by Professor F. Perrin (France) and Sir John Cockcroft (Britain), has approved a $30 million (about £10,714,000) programme for building an experimental nuclear reactor for joint European use at the new British research centre of Winfrith Heath, Dorset.

VIEWS on the NEWS

By REFLECTOR

A REPORT has appeared in the *Surrey Comet* of a small ceremony at Kingston-on-Thames at which Mr. W. H. Dunkley, controller of the South Eastern Division of the Central Electricity Generating Board, handed over a pressure gauge to the principal of Kingston Technical College. This was a token of the presentation to the College of over thirty items of equipment from the small power stations at Worthing, Lewes, Newhaven and Ramsgate which have now been closed down. Although the equipment is naturally not of the latest patterns it should serve well to give students an idea of the nature of power station ancillaries and it is quite a good idea to dispose of the gear in this way instead of selling it to scrap dealers at nominal prices.

* * *

Topic, the monthly newspaper of the Associated Electrical Industries group, publishes a letter in which the writer suggests that there should be A.E.I. ties and scarves "to distinguish us from the general public." This seems to be a trifle "up-stage" and an attempt to set up a new aristocracy—or should it be technocracy?

* * *

Controversy still goes on in the United States about the economics and propriety of the Tennessee Valley Authority which is now 25 years old and is (with more or less justification) described by the *Electrical World* (New York) as "the largest electric utility operation in the free world." I do not propose to enter into the arguments, which have powerful interests behind them, but I am interested to learn that the T.V.A. which started out as a flood control and hydro-electric undertaking now bases its power supply to the extent of 75 per cent on steam plant; the total capacity of its fifteen steam and 29 water-power stations is now over 10,000 MW. Great Britain's plant capacity is about 27,000 MW. The average "residential" rate in 1957 is given by the *Electrical World* as 1·15 cents (just under a penny) per kWh which seems to be rather low; the C.E.A.'s equivalent figure for 1956-57 was 1·581d.

* * *

The *Financial Times* has discovered a strange device attached to a new American gas cooker. It is

> "a little antenna on the back which picks up signals from a small control box without connecting wires or cords and which the housewife can carry with her and use to turn top burners on or off from anywhere in the house."

That is not all: there is also an electronic control on one top burner which is said to "make an automatic utensil out of every pan the homemaker uses." This looks like calling in the new world to redress the balance of the old.

* * *

The *Electrical Review* of 6th July, 1888, drew attention to the following business announcement in the *Norwood Press and Dulwich Advertiser*:—

> "T. Hall, late of Crown Hill, now of 42, Romany Road, is still open to supply the electric light, he having travelled with the same many years; also dealer in furniture, etc. He is also open to deal just and right with all customers in both branches, from his curiosity shop by seeing him on his round."

The *Review* commented as follows on this cryptic statement:—

> "Is it not more than probable that if all dealings in electric lighting matters had been just and right we should not have to deplore the want of enterprise which seems now to have taken such a fast hold in this country? If worthy Mr. Hall is not more successful than some of his better-known competitors in the electric lighting handicap, it seems to us that he will have to travel far away in the *ewigkeit* before he can hope to retire upon a modest competency."

An artist's conception of the dilemma in which the consumer and salesman might find themselves if gas–electric "co-operation" came about

PERSONAL AND SOCIAL

News of Men and Women of the Industry

Mr. F. Foster, M.Sc., A.M.I.E.E., has been appointed managing director of Crompton Parkinson (Stud Welding), Ltd. After an earlier period of service with F. and A. Parkinson, Ltd., as a sales engineer, Mr. Foster, a graduate of Leeds University, joined the General Sales Department of Crompton Parkinson, Ltd., in 1937 and was closely associated with the expansion of the company's interests in the field of f.h.p. motors. He became sales manager of the plant section of the Overseas Division in 1948 and in 1953 he was appointed general manager of the Cyc-Arc Stud Welding Division. Mr. Foster became responsible for the Crompton Parkinson stud welding organisation when the Nelson stud welding production plant was transferred from Manchester and united with the Cyc-Arc production facilities at Glanamman. He served as a member and as chairman of the junior board of Crompton Parkinson, Ltd., in 1950. When the new subsidiary company was formed last December he was appointed a director and retained his responsibility as general manager.

Mr. F. Foster

Last week we reported the formation by Associated Electrical Industries, Ltd., of two new divisions, the first to be set up following the chairman's announcement of the proposed change to a divisional organisation based on products. Below we give biographical notes on those appointed to the principal management positions.

A.E.I. Heavy Plant Division, managed by the British Thomson-Houston Co., Rugby:—

The divisional general manager is **Mr. L. Drucquer,** M.I.E.E., a director of the British Thomson-Houston Co. After obtaining his engineering diploma at London Polytechnic he gained practical experience in the B.T.H. Test Department at Rugby, subsequently spending two years on the outside construction staff before taking up an appointment in switchgear sales, Rugby. In 1926 he transferred with that department to Willesden, becoming assistant manager in 1939 and manager in 1945. In 1950 he was appointed manager, home sales, and in 1956 he was elected to the board. Mr. Drucquer is also chairman of the Switchgear Testing Co., Manchester. He was chairman of the Supply Section of the Institution of Electrical Engineers in 1955-56.

Mr. R. M. Grant, B.Sc., M.I.E.E., becomes divisional commercial manager. He graduated at Glasgow University, where he gained honours in electrical engineering and a diploma in engineering economics. After serving a graduate apprenticeship at Rugby, he joined the company's construction staff (London District) in 1932, returning in 1936 to take up a commercial engineering appointment in plant contracts, with particular responsibility at that time for power rectifiers. From 1946 until 1952 he was closely associated with the company's hydro-electric business and travelled extensively abroad. He was then appointed assistant manager, B.T.H. plant contracts, and in 1954 became manager.

Mr. L. D. Anscombe, M.A., M.I.Mech.E., M.I.E.E., the divisional chief engineer, was educated at Reigate Grammar School and Emmanuel College, Cambridge, gaining first-class honours in the Mechanical Science Tripos and his B.A. degree in 1927. From 1927 to 1930 he was a student (graduate) apprentice with B.T.H., Rugby, and then spent a year in the United States, having been awarded a B.T.H. Fellowship. He joined the then A.C. Engineering Department in 1931, specialising in synchronous motor and waterwheel alternator design. After a period in charge of the large a.c. machine design section he was in 1949 appointed manager of the newly-formed Plant Engineering Department which was made responsible for the design of all large a.c. and d.c. machines, excluding turbo-alternators.

Mr. Anscombe is a past-chairman of the Rugby Sub-Centre of the Institution of Electrical Engineers.

Mr. C. W. Furniss, divisional manufacturing manager, received his early training at the Rugby College of Technology and Arts whilst serving his apprenticeship with B.T.H. as a toolmaker from 1930 to 1935. Shortly after the outbreak of the last war the company took over a works at Peterborough for armaments manufacture and in 1941 Mr. Furniss was appointed foreman of the machine shop. In 1947 he returned to the Rugby works as assistant superintendent of the motor factory. In 1954 he became superintendent, Motor and Generator Factories, and three years later was appointed manager, Heavy Plant and Motor Factories.

Mr. N. R. D. Gurney, A.C.G.I., M.I.E.E., has been appointed divisional executive (Manchester). He received his technical education at the City and Guilds Engineering College and joined Metropolitan-Vickers as a college apprentice in 1926. In 1931 he was awarded an I.G.E. Fellowship to study steelworks electrical engineering at the General Electric works at Schenectady. In the following year he returned to the M.-V. Plant Department as rolling mill engineer, and in the course of steelworks business he has visited America, Australia, New Zealand and the Continent. He is a member of the Iron and Steel Institute.

During the last war Mr. Gurney was seconded to special duties, becoming engineer-in-charge and later acting as assistant superintendent of the M.-V. Carriage Department. At the end of the war he returned to the rolling mill engineering section of the Plant Department and was later appointed chief engineer, electrical general engineering, covering the industrial, mining and rolling mill sections, and more recently he has been sales manager of the Plant Department.

Mr. L. Drucquer

Mr. R. M. Grant

Mr. L. D. Anscombe

Mr. C. W. Furniss

Mr. N. R. D. Gurney

Mr. R. J. Cochran

Mr. W. H. Darlington

Mr. W. N. Kilner

Mr. R. R. Whyte

Mr. D. R. S. Turner

Mr. J. G. Boddy

A.E.I. Turbine-Generator Division, managed by the Metropolitan-Vickers Electrical Co.:—

Mr. R. J. Cochran, the divisional general manager and divisional commercial manager, was educated at Rothesay Academy, Bute, and the Royal Technical College, Glasgow. After service for five years with Stevenson & McGuffie, consulting engineers, he joined Metropolitan-Vickers in 1929 and was appointed sales manager, Transformer Department, in 1945. In 1955 he left the Transformer Department to become sales manager, Plant Department. In recent years Mr. Cochran has travelled widely, visiting South Africa, India, Australia, New Zealand, the United States and Canada.

Mr. W. H. Darlington, M.B.E., Ph.D., M.Sc.(Eng.), A.C.G.I., D.I.C., A.M.I.Mech.E., M.I.Mar.E., A.F.R.Ae.S., divisional chief mechanical engineer, received his technical education at the City and Guilds College, London, becoming a Metropolitan-Vickers college apprentice in 1935. He then joined the Mechanical Engineering Department, later becoming a section leader and being concerned in the wartime development of the gas turbine; for this work he was made an M.B.E. In 1950 he was appointed assistant chief engineer of the Condenser and Gear Engineering Departments and, in 1952, chief engineer. Gas Turbine and Gear Engineering Departments.

Mr. W. N. Kilner, M.I.E.E., divisional chief electrical engineer, joined the turbo-generator section of the M.-V. Plant Engineering Department in 1924 and has been responsible for the design of many of the largest generators installed at C.E.G.B. power stations. In 1946 he became assistant chief engineer, and in 1955 was appointed chief engineer of the newly formed Turbo-Generator Engineering Department. Mr. Kilner is chairman of the Turbine Type Generator Technical Committee of the International Electrotechnical Commission, and a member of a number of B.E.A.M.A. and B.S.I. Technical Committees. He was chairman of the Supply Group Committee of the North Western Centre of the I.E.E. for 1952-53.

Mr. R. R. Whyte, M.B.E., B.Sc.(Eng.), divisional manufacturing manager (Trafford Park), was educated at University College School and the City and Guilds Engineering College, taking a degree in mechanical engineering in 1932. After one term at Freiburg University he went to M.-V. as a college apprentice in 1933, and after six months' turbine manufacturing experience in Prague joined the Mechanical Department. Working first in the turbine experimental section under H. L. Guy he transferred in 1937 to the manufacturing side. In 1944 he became assistant superintendent, Mechanical Department, and later in that year took charge of gas turbine manufacturing at the M.-V. Barton Works. He was appointed superintendent of the Gas Turbine Department (later Small Turbine Department) in 1949. In 1954 his responsibilities were extended to include the company's Germiston Works in Glasgow. Since January, 1957, he has been assistant works manager (mechanical), being responsible for the Large and Small Turbine Departments at Trafford Park and for the Germiston Works.

Mr. D. R. S. Turner, B.A., A.M.I.Mech.E., divisional manufacturing manager (Larne), was educated at Oundle and Cambridge, and graduated (hons. Mechanical Science Tripos) in 1938. After practical training in Switzerland and in the United Kingdom, including B.T.H., Rugby, and M.-V., Trafford Park, he was on active service for six years in the Royal Navy as an engineer officer. In 1946 he joined the staff of B.T.H. Turbine Contracts and in 1950 was appointed assistant manager of that department. In 1953 he returned to the manufacturing side as assistant general superintendent, Rugby Works, with special responsibility for what was then designated "the Larne project." He was appointed manager, Larne Works, in 1955, assuming direct responsibility for the building-up and organisation of that turbine manufacturing plant.

Mr. J. G. Boddy, B.A., divisional executive (Rugby), was educated at Cheltenham College and Queens' College, Cambridge. Joining the B.T.H. Co. as a student apprentice, he took a commercial trainee course and had experience on outside constructional works, later joining the B.T.H. Manchester district office in 1936. In 1938 he was seconded to the Ministry of Aircraft Production as electrical engineer in charge of the construction of the Ministry's new plant at Magnesium Elektron, Ltd., returning to the B.T.H. (Rugby) Turbine Sales Department in 1940. Two years later he was seconded to the United States Defense Plant Corporation as consultant and electrical manager at the Basic Magnesium, Inc., plant at Las Vegas, Nevada. In 1945 he returned to B.T.H. and in 1946 took up residence in Argentina as manager of Latin American sales. Returning to England in 1953 he became a deputy manager of the B.T.H. Turbine Contracts Department and was appointed manager in 1956.

On the advice of his doctors and by mutual agreement with the Central Electricity Generating Board, **Mr. L. F. Jeffrey,** B.Sc.(Eng.), M.I.C.E., M.I.Mech.E., M.I.E.E., has retired from the position of divisional controller, East Midlands Division, as from 30th June.

The Minister of Power has appointed **Mr. J. D. Nicholson,** B.Sc., M.I.E.E., to be a member of the Yorkshire Electricity Board. Mr. Nicholson will combine his Board duties with those of his present position as chief engineer of the Board.

Mr. Herbert Walrond, A.M.I.E.E., has been appointed engineer of the new Ilkeston and North Derbyshire Sub-Area of the East Midlands Electricity Board. Mr. Walrond joined the Northampton Electric Light & Power Co., Ltd., as an assistant in the Buckinghamshire District after obtaining his diploma at Faraday House in 1931. In the following year he moved to Northampton, and soon afterwards he was appointed meter and test superintendent, a position which he retained until 1947. In addition to his other duties, he has been concerned with substation developments, first as assistant technical engineer and, more recently, as meter and substation engineer.

Mr. H. Walrond

Mr. N. Maggs has joined the Systems Engineering Division of Electroflo Meters Co., Ltd., as contracts engineer and **Mr. F. Cheventre** as outside representative for the Division in the London and Southern England areas. Mr.

Mr. S. F. Steward, C.B.E., chairman of the Lancashire Dynamo Group, who has many personal associations in Ipswich, took the opportunity of meeting business friends at the inauguration of the Group's new Eastern Area offices at 12, Princes Street, Ipswich, on 24th June. The picture shows (left to right): Mr. J. A. Robertson (Bexford, Ltd.), Mr. Steward, Mr. W. F. Rowberry (hon. secretary, Ipswich and District Electrical Association), Mr. S. Hardy (B.X. Plastics, Ltd.) and Mr. B. L. Perkins (Eastern Area manager, L.D. Group)

Maggs was previously with the Cambridge Instrument Co., Ltd., and Mr. Cheventre with Sunvic Controls, Ltd.

The G.E.C. Crystal Valve Works (**Salford Electrical Instruments, Ltd.**) held their first annual gala and sports day in Torkington Park, Hazel Grove, Cheshire, on 14th June, when excellent weather contributed to the enjoyment of over 3,000 who attended. In addition to the usual sporting activities, displays were given by the Manchester Regiment T.A. Band and "Ack Ack" and Stockport Fire Brigade.

Mr. Andrew M. Brown, M.A., Ph.D., has been appointed executive director of the Plessey Co., Ltd., with special responsibilities as personnel co-ordinator. He takes up his duties on 7th July.

Mr. D. J. Ayers has been appointed sales manager of S. O. Bowker, Ltd. Previously Mr. Ayers was with Ashley Accessories, Ltd., and Astral Switchgear, Ltd.

Mr. G. Dring, M.A., B.Sc., F.R.I.C., M.I.Chem.E., F.P.I., retired from the board of Bakelite, Ltd., on 30th June. He will continue to serve in a non-executive capacity as technical consultant in regard to research, patents, trade marks and other matters and will represent the company in various technical and scientific activities both at home and abroad. Mr. Dring is chairman of the Plastics Industry Standards Committee of the British Standards Institution and a vice-president of the Plastics Institute. He was appointed research chemist to the Damard Lacquer Co. in 1921 and following the amalgamation of the company and Mouldensite, Ltd., in 1927 and the formation of Bakelite, Ltd., he was appointed works manager at Darley Dale. When the new factory was opened at Tyseley in 1932 he moved to Birmingham in charge of the Development Department. He has been a director of the company since 1942.

Mr. G. Dring

Mr. P. E. Tayler, who was a member of the headquarters staff of the Electrical Industries Benevolent Association from 1946 until 1951, has returned to its service as assistant secretary.

After nearly 29 years with the Express Dairy Co., Ltd., **Mr. C. C. Garland,** Associate I.E.E., manager of the Electrical Department, has retired. On the occasion of his retirement he and his wife received presentations from the management and staff.

Mr. George A. Shea, one of the best-known Atlas Lighting representatives, retired last week after more than twenty-five years' association with Thorn Electrical Industries, Ltd. A farewell dinner was held in his honour on 27th June.

Next Tuesday's luncheon of the **Electrical Industries Club** will be the annual ladies' luncheon and the guest speaker will be Miss Marie Löhr, the well-known actress. There will be no meeting of the Club in August.

The annual sports meeting of the London establishments of the **General Electric Co., Ltd.,** took place at the company's sports ground, Preston Park, Middlesex, last Saturday. The Research Laboratories won the Leslie Gamage Trophy for the greatest number of points (63), the Head Office being second with 22. The prizes were presented by the Hon. Mrs. Leslie Gamage.

OBITUARY

Mr. Moss Mansell, one of the three original directors of the Strand Electric and Engineering Co., Ltd., died on 18th June in London. Mr. Mansell for many years ran his own firm, Mansell & Ogan, specialising in arc resistances, dimmers and other switching gear. He joined forces with the late Arthur Earnshaw and Philip Sheridan in the Strand Electric in due course and remained works director until 1936. In 1929 he invented the magnetic clutch on which the majority of British stage and television lighting remote controls are still based. During the war he returned to lend a hand as staff manager at the works.

Mr. W. A. Sloane, formerly manager of the Liverpool branch of the London Electric Wire Co. & Smiths, Ltd., died on 22nd June, aged 70. Mr. Sloane, who was a native of Liverpool, served his electrical apprenticeship in that area before transferring to Nigeria. He remained there for 14 years with a firm of refrigeration engineers, subsequently returning to this country in 1926. He joined the London Electric Wire Co. & Smiths, Ltd., and opened their Liverpool branch, where he remained until his retirement in December last. Mr. Sloane was a founder member of the Liverpool branch of the A.S.E.E. and was a prominent member of the Liverpool Engineering Society.

Mr. P. G. Hieatt.—The death occurred suddenly on 25th June, at the age of 73, of Mr. P. G. Hieatt, M.I.E.E., M.Inst.F., who retired in December, 1954, after more than 50 years' service in the electricity supply industry. Mr. Hieatt began his career with the North Metropolitan Electric Power Co. and held power station appointments at York, Rotherham, Derby, Croydon and Hackney until 1931, when he was appointed control engineer of the Mid-East England Area of the Central Electricity Board, later becoming senior assistant operation engineer. He was operation engineer of the combined M.E.E. and N.E.E. area of the C.E.B. from 1946 to 1948, and on nationalisation was appointed system operation engineer of the Yorkshire Division, British Electricity Authority. In 1948 he became personal assistant to the divisional controller. Mr. Hieatt was hon. secretary of the original Southern Division of the Electrical Power Engineers' Association from 1922 to 1931.

The late Mr. P. G. Hieatt

Mrs. K. Goodenough.—The General Electric Co., Ltd., announces the death, after a long illness, of Mrs. K. Goodenough, who was personal secretary to Mr. Leslie Gamage, chairman and managing director of the G.E.C., for over thirty-seven years. Mrs. Goodenough joined the company in 1918 and became secretary to Mr. Gamage in 1920, on his appointment as secretary of the company.

I.E.E. Conversazione

THERE were over 2,000 members and guests at a conversazione held by the Institution of Electrical Engineers at the Royal Festival Hall last week. Mr. T. E. Goldup, C.B.E., President, and Mrs. Goldup, assisted by Mr. S. E. Goodall, M.Sc.(Eng.), President-elect, and Mrs. Goodall, received the members and guests in the upper foyer.

About 70 exhibits and demonstrations of advances in science and engineering and their applications were shown. The demonstrations included a colour television system working on a closed circuit. This feature was arranged by the B.B.C. and guests were interviewed in front of the camera by Miss Sylvia Peters. The pictures could be seen on five colour receivers distributed about the Festival Hall. Between the interviews, colour slides were displayed. The colour camera used was manufactured by Marconi's Wireless Telegraph Co., Ltd., the colour receivers by Murphy Radio, Ltd., and the slide scanner by the B.B.C. Demonstrations included a model of "Sceptre" in which success was achieved in stabilising pinched toroidal discharge, and there were a number of exhibits relating to the generation of electrical power by nuclear reactors.

During the evening, two concerts were given by the Band of the Irish Guards and Jacqueline Delman, soprano, in the Concert Hall and there was dancing in the main foyer.

Above: The President-elect, Mr. S. E. Goodall, and Mrs. Goodall and (right) the President (Mr. T. E. Goldup) and Mrs. Goldup receiving the guests at the I.E.E. Conversazione

MANAGERIAL ELECTRICAL EXECUTIVE

IN accordance with the practice established when it was composed of municipal chief electrical engineers, the Association of Managerial Electrical Executive held its annual general meeting at Brighton on 18th June, during the week of the Electrical Power Convention. About fifty members assembled at the South Eastern Electricity Board's headquarters to hear the president, Mr. H. G. Penniket, present the annual report for the year 1957-58.

Mr. Penniket referred to the main event in that period —the virtual completion of the new salary agreement for the managerial and higher executive staffs of the electricity supply industry in the negotiations. He said that while the new salary scale had not achieved all that some members had hoped for, it constituted a great step forward for, in addition to raising the salaries of practically all the members, it had done much to remove anomalies which existed under the previous agreement of 1952. The "ceiling" which had tended to depress salaries before had now been lifted and, whilst some differentials had been altered, this was not unexpected; in fact it was inevitable in view of the chaotic nature of the earlier structure. Any defects in the new agreement revealed by experience could be adjusted later.

The president then mentioned some of the issues dealt with in the report on which the Association had brought, and was still bringing, its influence to bear, such as staff compensation, reorganisation under the Electricity Acts, and the inquiry into the possibility of co-operation between Electricity and Gas Boards on which a memorandum had been sent to the committee recently appointed by the Minister.

The president announced that the following officers had been elected for the year 1958-59:—President, Mr. E. C. Lennox (North Eastern Board); vice-president, Mr. H. Marriott (South Eastern Division); immediate past-president and hon. treasurer, Mr. H. G. Penniket (Eastern Division); hon. assistant secretary, Mr. A. E. Jeans (Southern Board); trustees, Mr. A. E. Morgan (London Board) and Mr. C. Cameron Kirby (Yorkshire Board).

Mr. Lennox moved a vote of thanks to the retiring president and Mr. Penniket responded.

At the A.M.E.E. annual general meeting: Mrs. C. A. Heathfield, Mr. J. W. Thomas (secretary), Mr. H. G. Penniket (president), Mr. E. C. Lennox (vice-president) and Mr. A. E. Jeans (hon. assistant secretary)

Parliamentary Report

Plutonium from Atomic Power Stations

In the Commons last week Mr. Roy Mason asked the Paymaster General why the Government had decided to modify atomic power stations, primarily planned for peaceful purposes, to produce high-grade plutonium for war weapons and to what extent this would interfere with the atomic power programme.

Mr. Reginald Maudling replied that at the request of the Government the Central Electricity Generating Board had agreed to a small modification in the design of Hinkley Point and of the next two stations in their programme so as to enable plutonium suitable for military purposes to be extracted should the need arise.

The modifications would not in any way impair the efficiency of the stations. As the initial capital cost and any additional operating costs that might be incurred would be borne by the Government, the price of electricity would not be affected. The Government made this request in order to provide the country at comparatively small cost with a most valuable insurance against possible future defence requirements. The cost of providing such insurance by any other means would be extremely heavy.

Mr. Mason said it was " a disgusting imposition on what was primarily termed a peaceful programme in nuclear energy." He was pleased that it did not interfere with the atomic energy programme prepared by the Government, although he accepted it with some measure of reservation. But was it really necessary, in view of the fact that we should soon be producing plutonium from the Dounreay atomic breeder ?

Mr. Maudling said that the only imposition on the country would have arisen if the Government had met their defence requirements for plutonium by means far more expensive than those now proposed.

Mr. Emrys Hughes asked the Secretary of State for Scotland to what extent the atomic station at Hunterston, Ayrshire, was to be used for the production of material for military purposes.

Mr. J. S. Maclay said the Government were concerned solely with the possibility of securing additional sources of military plutonium should the need for them arise. He could not at present forecast what use, if any, would be made of Hunterston in these circumstances.

Later, replying to questions by Mr. Robens, Mr. Palmer and Mr. Mason, the Parliamentary Secretary to the Ministry of Power (Sir Ian Horobin) said that the capital cost of the modifications was not yet known precisely but was unlikely to exceed 1 per cent of the cost of the stations concerned. Since this would be borne by the Government, it would not affect the cost of the civil nuclear programme. The necessary alterations in the designs of the stations could be made without affecting building progress. The additional operating cost that would be incurred by the electricity authorities, if the facilities were used, would be very small and would also be borne by the Government. The nuclear programme was kept under constant review in the light of all relevant factors but had not been revised since it was rephased last year as part of the general revision of capital investment.

Mr. Robens asked who was to pay the increased capital cost of the additional fuel charges.

Sir Ian Horobin said he did not see that this arose. The question at issue was how long these charges remained under irradiation in the reactors. Whether one left them there a longer or shorter time decided what type of isotopes of plutonium were obtained.

Mr. Robens thought the question did arise. To get plutonium of weapon grade he understood it would require five charges to the one which the electricity authorities would have been required to pay for, because it took about fifteen months to extract the plutonium from the uranium rods.

Sir Ian Horobin said he had been referring to capital costs. There would be an additional cost owing to the fact that the rods would be moved through the reactor more frequently, and this, since it was a defence cost, would be met by the Government.

Mr. Palmer: " Would the Minister agree that this mixing of the military and the civil aspects is likely to make it very difficult for us to form a proper estimate of the true operating costs and may therefore have an adverse effect on the expected exports of British nuclear power stations ? "

Sir Ian Horobin said that was a difficult question to answer. The obvious reply was that there would be at least two of the nuclear power stations that were not modified so that the facts and figures would be obtainable from them.

Privilege Case

In a report issued on Monday the Committee of Privileges of the House of Commons recommends that no further action should be taken in the case of breach of privilege involving the London Electricity Board.

The case arose out of a letter which Mr. G. R. Strauss, Labour M.P. for Vauxhall, wrote to the Paymaster General, Mr. Maudling, on 8th February, 1957, in which he stated that the L.E.B.'s method of disposing of scrap cables must lose the Board and the public substantial sums, and that it must be considered a public scandal. Later the solicitors to the Board threatened to institute proceedings for libel against Mr. Strauss.

In making its recommendation the Committee refers to the special circumstances of the case, which is the first arising out of a letter from a Member of Parliament to a Minister which has come before the Committee, and to the fact that no proceedings have been taken. The Committee's report is likely to be debated by the Commons next week.

L.E.B. Contracting Section

Mr. Charles Hobson asked the Paymaster General if he had now considered the report made to him by Deloitte, Plender and Griffiths into the affairs of the Contracting Section of the London Electricity Board, and when the report would be placed in the library of the House.

Sir Ian Horobin replied that since the inquiry started the Southampton police had found it necessary to investigate certain transactions in this connection. He could not therefore say when the report would be made available to Parliament.

Television Tube Repairs

Sir Norman Hulbert asked the Chancellor of the Exchequer why, under his regulations, a television tube which had to have the " gun " replaced attracted purchase tax.

Mr. Heathcoat Amory said the insertion of a fresh gun in a television tube amounted to the manufacture of a virtually fresh tube and tax was therefore chargeable under the law. If a person who had sent the tube for repair got back the same tube and the same gun, repaired, purchase tax was not charged on the cost of the tube.

Electricity Investment Programme

Mr. M. Bonham Carter asked the Chancellor of the Exchequer, in the light of the relaxations in the financial restrictions he has recently introduced, whether he would restore the cuts in the electricity investment programme.

Mr. Simon, Financial Secretary, Treasury, replied that the level of investment in the public sector as a whole in the years immediately ahead was now under consideration. He could not, however, predict that the level of investment already authorised in any particular part would be raised.

Electricity-Gas Co-operation

In reply to Mr. Batsford, Sir Ian Horobin said he understood that the Committee examining co-operation between the electricity and gas industries had already held four meetings and had received a considerable volume of evidence. It was at present considering meter reading and billing, service centres and showrooms, advertising and co-operation in regard to the Public Utilities Street Works Act, 1950, and would welcome comments from any body or person interested.

INDUSTRY AND THE HOUSE

By A. M. F. PALMER, A.M.I.E.E., M.Inst.F., M.P.

SUMMER—in the limited English sense—has arrived at Westminster and with it the steady toil of members through the complicated clauses of the Finance Bill.

On clause 13 the Chancellor of the Exchequer, Mr. Heathcoat Amory, said that it remained the aim of the Government to strengthen sterling. Price stability was still their first objective. For this reason they had been obliged to restrain the expansion of industry but it was undesirable that their policy should be over rigid. A sensible government—by which he meant his own obviously—adjusted its policies when "the situation demanded adjustment."

Mr. Amory said he had therefore come to the conclusion that it would be as well now to give some practical encouragement to industrial development by an improvement in taxation allowance rates. He proposed to increase the allowances to manufacturers and others for new plant and machinery from the published rate of 25 per cent to a new 30 per cent. Industrial building allowances would advance from 12½ per cent to 15 per cent. The concessions would take effect as from the Budget and the consequent cost to the Exchequer would be doubled approximately.

Concessions Welcomed

This Government move gave Mr. Harold Wilson for the Opposition the opportunity to say he was glad that the Chancellor of the Exchequer was coming if only slowly to the view that industrial investment must be encouraged once again; the Opposition believed that the time was overdue for an expansion in industrial production. Britain must have "a high investment economy."

Mr. Wilson wanted to know if the Chancellor's announcement was part of a general series of anti-recession measures? To this pointed inquiry Mr. Amory said he could only repeat the words he had used before. The Government's policies were always flexible; they would change them whenever they felt a change was required in the light of changing circumstances. In this fashion the amended clause was agreed to amid general approbation.

But the sweet spirit of unity was nothing like so obvious when we moved to discussing the controversial subject of dividend stripping. It will be remembered the Chancellor of the Exchequer proposed originally that not only should the loophole by which untaxed gains were extracted from the financial assets of companies be stopped up but that this should be done retrospectively. That was Mr. Amory's own position at the time of his Budget statement. Then later on, after strong exception had been taken by his own back benchers, and by many outside, to the retrospective principle, the Chancellor altered course. Hence, the Finance Bill, as drafted, has discarded retrospection.

As I said, I think here before, it is a sound constitutional assumption—not to be lightly put aside—that citizens should not be penalised for doing what the law allowed them to do at the time they did it. Yet considering all things it was not unfair for Opposition spokesmen to argue that the Chancellor had run away from his own declared stand because of pressure from interested parties. Mr. Eric Fletcher, a very competent Labour debater who sits for Islington East, certainly made that point very well. He accused Mr. Amory of having shown what Mr. Fletcher called "the common failing of Conservative Ministers"; of being more sensitive to the claims of "the interests" than to that of the public purse. In a picturesque phrase, his accuser said the Chancellor had known what was "the path of righteousness and duty" but had deliberately chosen the opposite way. Hence he had committed "the sin of apostasy."

Mr. Amory is a mild man but he rose strongly to this attack. He said he resented the suggestion that he had been influenced in his decision by the views of the kind of people who indulged in these doubtful practices. In any case, he continued, the effect of the Opposition amendment to insert retrospection would be very limited. It would apply in cases where shares had been acquired after December, 1955, only if the tax liability for the current year was affected. Very few companies in fact would be caught by the amendment if carried which would not be caught by the clause as it stood. While against retrospection as a principle he did not go so far as some in regarding it as entirely wrong in *all* circumstances. The matter must be judged according to the merits of each case.

After this further Ministerial compromise with sin, debate was fast and furious. Mr. Harold Wilson said that at the time of the Budget the Chancellor was obviously strongly under pressure from the Board of Inland Revenue. But as soon as he felt the parliamentary draught from behind him, his direction changed. Then finally the Inland Revenue had spoken again, for they knew from experience that a tough line had to be taken with tax evaders. Hence the Chancellor's bland statement that he was really not converted from retrospective legislation but that "this was not the time."

Sir Toby Low, a respected ex-Ministerial Conservative back bencher, said that it was important that the law should be certain and that people in conducting their transactions should know whether they were subject to taxation or otherwise. Nobody on the Conservative benches was in favour of tax dodgers or financial sharks.

After debate, which lasted until late and was enlivened by Mr. Nabarro's attempt to suggest that the financial sponsors of Labour's leading daily paper had in effect gained tax reliefs by their recent full purchase of the paper—a charge stoutly denied by Labour members—the Opposition amendment was rejected by a Government majority of 39.

Ministry of Power

It will be interesting to know if the recommendations of the Select Committee on Estimates about the Ministry of Power will be taken serious notice of by the Government. I have in mind in particular, of course, the guarded suggestion that the future role of the Ministry as such should be reconsidered. If indeed the Government does divide up the department and share its work out then I think this would be a backward step. Energy and energy policy is fundamental to the industrial existence of the United Kingdom and seems to deserve a Minister of its own quite as much as any other branch of the national life. After all, that was the view that the Government itself took when it appointed not so long ago Lord Mills as Minister of Power with an enhanced standing as a member of the Cabinet.

Railway Modernisation

SOME SECTIONS AHEAD OF SCHEDULE

IN its report for 1957 published last week* the British Transport Commission records encouraging progress with the re-equipment and reorganisation of British Railways and states that in some of its most important elements the modernisation plan was well ahead of the timetable envisaged in 1955.

Electrification at 25 kV a.c. on the former London Midland main line was up to schedule in 1957. On Stage I from Manchester to Crewe, the erection of the overhead equipment on the pilot section through Styal was nearly complete at the year's end, thanks to the use of modern automatic borers and concrete mixing plant, and wiring had started. Trial runs and mechanical testing had been begun. The final phase was replanned so that complete electrification in and out of Manchester (London Road) can be introduced in 1960 instead of 1961. A full survey of the Stage II section, Crewe-Liverpool, was in progress, the contract for the overhead equipment having been placed. On the Colchester-Clacton-Walton electrification pilot scheme, civil engineering work was virtually completed during 1957, and trial running should start according to plan in 1958. Re-signalling of both these routes with modern colour-light equipment had begun.

The Regions concerned are preparing a report on the factors involved in the electrification of the main East Coast line beyond York, with broad financial assessments. No constructional work has begun on the King's Cross-York section, envisaged in the modernisation plan, although the permanent way is being strengthened in a number of places in anticipation.

The first phase of the Southern Region electrification (Gillingham to Sheerness, Margate and Ramsgate; Faversham to Dover) is, like the others, making excellent progress and is due for completion in June, 1959. Half of the conductor rail has been delivered to site and several miles of rail and cable have been laid.

Work proceeded satisfactorily on the various schemes of suburban electrification. For the Glasgow suburban scheme, a contract was placed for the erection of the overhead line equipment, and preparatory work is up to schedule. For the London, Tilbury and Southend and the Enfield, Chingford, Hertford and Bishop's Stortford schemes, contractors made good progress on substantial civil engineering works.

The total amount of electric rolling stock required for all these schemes and for the modernisation of existing electric services in the 1957-62 period is expected to be about 370 locomotives and 2,000 multiple-unit vehicles, and orders for the earliest requirements were placed, including contracts for 100 main line locomotives. Following the capital cuts, it will be necessary to slow down delivery of certain electric locomotives where this can be done without delaying the planned introduction of electric traction.

By the end of 1957, the first 22 of the 174 main line diesel locomotives which had been ordered in 1955, mainly for the London, Midland and Eastern Regions, had been delivered. Fresh orders were placed for 101 main line diesel-electric locomotives, 38 for the Eastern, 18 for the Scottish, and 45 for the Southern Region; and for 82 main line diesel-hydraulic locomotives for the Western Region. It is pointed out that in a number of respects the Commission are breaking new ground in public transportation and that consequently technical problems are having to be solved for the first time. The latest practices in other countries, including the United States and Canada, have been studied, with special reference to electric and diesel traction, freight operation including road-rail transfer, and the design of rolling stock. The ideal of more efficient and faster freight services with a greatly reduced wagon fleet calls for new methods of control and recording. In this connection, electronic data-processing systems are being studied. The intensive operation at high speeds of the diesel and electric locomotives, with their greater weight and smaller wheel diameters, gives rise to new problems in track design. In order to speed up the handling of freight vehicles in marshalling and terminal yards, the development by industry of a satisfactory design of fully-automatic coupler has been encouraged, and the answer is now in sight. Even the conventional railway carriage bogie has had to be studied afresh with the aim of providing smoother riding at the high speeds envisaged in the modernisation plan. In all this important and urgent development work, much of it in new fields, the Commission's own engineers and technicians have been greatly assisted by independent scientists and by manufacturers.

The consolidated revenue account for 1957 shows a working deficit on British Railways of £27·1 million to which is added £41 million interest and other central charges, making £68·1 million. On the Commission's other activities there was a net working profit of £23·4 million from which is deducted £18·8 million interest and other central charges, leaving a surplus of £4·6 million.

* H.M. Stationery Office, 6s.

"Electrical Who's Who"

SINCE the "Electrical Who's Who" was produced by the *Electrical Review* eight years ago this guide to the people in the electrical profession and industry has become a standard work of reference. Each edition has been expanded with the growth of the industry and the fifth edition, which has now been published, contains in its 530 pages close upon 8,000 names of men and women in all sections of the profession and industry.

The entries consist of brief biographical details of people in the electricity supply industry, electrical manufacturers, electrical contractors, wholesalers and retailers, trade associations, consultants, electrical engineers in Government Departments, the National Coal Board, etc.

In addition, all names are classified in an index to Boards, companies and other bodies, showing at a glance the principal officers in each organisation.

Copies are obtainable from booksellers and newsagents or from Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, who distribute the directory for the publishers, Electrical Review Publications, Ltd. The price is 27s 6d (postage 1s 6d).

INDUSTRIAL NEWS

Calder Hall Mishap

At 7.30 p.m. on 28th June turbine No. 5 at Calder Hall "B" power station disintegrated. The United Kingdom Atomic Energy Authority says that it is not certain as to the cause but it would appear that a valve jammed and the turbine, which was undergoing tests, over-speeded and caught fire. Since the reactor associated with this turbine was in no way affected there was obviously no release of radioactivity and no danger to the public. The explosion blew a hole in the roof of the turbine hall and parts of the machine were scattered around the station site. However, none of the 20 people working there suffered significant injury. The fire was dealt with by the station's own fire brigade and the turbine hall was further flooded by water from pipes fractured by the explosion. It is understood that an immediate inquiry into this "purely mechanical" accident is to be made and the findings will be made known in due course.

Engineering Wages Claim

A claim for an increase in wages of not less than 6 per cent was lodged last week by the Confederation of Shipbuilding and Engineering Unions. This is the first claim since the "standstill" agreement made last year came to an end in May. The claim is based on the rise in the cost of living since the last increase was granted; the effects of the Rent Act; the increase in insurance contributions; an alleged reduction in the real value of craftsmen's wages since 1938; and the high dividends paid by engineering concerns. The employers have promised to give their reply to the claim without undue delay and in any event within three months.

The Confederation has also presented a plan for the reduction of working hours to eight a day by 1st January, 1961, in three yearly stages.

Large Ceylon Contract

Crompton Parkinson, Ltd., have secured a £250,000 order from the Government of Ceylon for the supply, erection and commissioning of three 25 MVA transformer substations to be incorporated into a 33 kV distribution system for Colombo. The order includes nineteen circuit-breakers of 750 MVA breaking capacity (to be manufactured by Cooke & Ferguson, Ltd., a subsidiary of Crompton Parkinson), isolators, busbars, lightning arrestors, the whole of the outdoor steelwork and the control panels for the switchgear. Eighteen l.v. units and four auxiliary transformers will also be supplied.

The six main transformers are each 12,500 kVA, 33/11 kV with on-load tap-changing gear. Switchyard lighting equipment and cables will also be of the company's manufacture and the substation building and attendant civil work will be done by the company's agents, Bousteads (E. & C.) Ceylon, Ltd.

Prices of Materials

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures given are the selling prices and are those quoted on Tuesday last.

ALUMINIUM ingots	ton £180 0s 0d
COPPER, H.C. Electro	ton £195 15s 0d
Fire Refined 99·70%	ton £194 0s 0d
Fire Refined 99·50%	ton £193 0s 0d
COPPER Tubes ..	lb 1s 11½d
Sheet	ton £227 5s 0d
H.C. wire and strip ..	ton £248 15s 0d
LEAD, English ..	ton £72 15s 0d
Foreign	ton £71 0s 0d
MERCURY	flask £76 0s 0d
TIN, block (English) ..	ton £730 5s 0d
ZINC, G.O.B. Foreign	ton £63 15s 0d
Electrolytic	ton —
BRASS Tubes (solid drawn)	lb 1s 6¾d
Sheet	ton —
Wire	lb 2s 4¾d
PHOSPHOR BRONZE Wire	lb 3s 8¾d
PLATINUM	oz £25 0s 0d
RUBBER, No. 1 R.S.S. spot	lb — —

S.T.C.'s 75th Anniversary

This year Standard Telephones & Cables, Ltd., celebrates its seventy-fifth anniversary. The business began soon after the invention of the telephone as a small agency; since then it has become a leader in the realm of telecommunications. To mark this anniversary the company has this week been holding an exhibition at the Waldorf Hotel, London.

The exhibition gives a good idea of the company's range in a series of about a hundred items. Included in the display are broadcasting transmitters, direction finders, aircraft navigation and ground-control equipment, coaxial telephone systems and repeaters, carrier telephones, television radio links, telegraph apparatus, silicon resistors, loading coils, telecommunication and power cables, power factor correction capacitors, a hydrophone, a collection of historic and modern valves, transistors, selenium and silicon rectifiers, magnetic materials, microphones and loudspeakers, automatic telephone exchanges, printed circuits and the "Zebra" computer.

The company has also arranged a special window display at its Aldwych headquarters, a photograph of which is reproduced.

Window display in Aldwych to mark Standard Telephones' seventy-fifth anniversary

"Son et Lumière" at Greenwich Again

Atlas Lighting, Ltd., have accepted the invitation of the Minister of Works to present a display of *Son et Lumière* at Greenwich this year from 31st July to 11th October every evening except Sundays. They have also undertaken to ensure that there is no risk to public funds. Any profits will go into the Exchequer and a similar sum will be devoted to improvements in Greenwich Park and the National Maritime Museum which could not otherwise be carried out.

The aim of the lighting installation will be to provide maximum flexibility giving variation of illumination level, direction and colour. Incandescent lamps will be used for strongly directional effects, but all colour changes will be achieved by mixing coloured fluorescent light. Fluorescent lighting is stated to have a number of important advantages for this work. Large vertical surfaces can be brilliantly illuminated in colour and the desired colours are obtained by an additive process as opposed to the subtractive

The entire lighting and sound systems for the Greenwich "Son et Lumiere" display will be operated from these Atlas electronic control panels

method involved when incandescent lamps are used with coloured filters. Thus, higher light levels can be obtained with a lower power consumption and at less cost. The lighting effects are controlled from electronic control panels which provide fingertip control of any number of circuits or groups of circuits by one operator. Since all the cables to this equipment are at low voltage the operator can be placed in a position, similar to the audience, where he can see exactly what is happening. The specially recorded sound track will be reproduced from a number of column loudspeakers positioned to produce stereophonic and directional effects. The sound equipment will be provided by E.M.I. Sales & Service, Ltd.

The show this year will be a new presentation under the direction of Harold Holt, Ltd. Mr. Hugh Ross Williamson has re-written the script and the cast will be headed by Mr. Charles Laughton. Last year 130,000 people paid to see the show which ran for two months.

Staffs Help E.I.B.A.

A good example of what can be achieved by a well-planned campaign to get extra subscribers for the Electrical Industries Benevolent Association is provided by one conducted among the staff of the Southern Electricity Board, which has resulted in 1,340 people joining the E.I.B.A. as members or associate members, in spite of the fact that the number already contributing (700) was much higher than the average. This means that the total number of staff employees now contributing is over 2,000. The campaign was undoubtedly helped by the fact that arrangements were made to collect the subscriptions in instalments by deduction from salary.

Jamaican Contract

An order has recently been received by Austinlite, Ltd., from the Jamaican Telephone Co., Ltd., for the supply of two automatically-controlled diesel generating plants for installation in the new radio telephone network which is to provide a long distance service throughout the island. The network has been planned in conjunction with Telephone & Associated Services, Ltd., consultants to the Jamaican company, and the first stage is scheduled for completion by the end of this year.

The Austinlite equipment is for use as standby to the main power supply at Kempshot and Christiania and is of the no-break type. Both units are basically the same, the set at Kempshot having an output of 2·5 kVA and that at Christiania 7·5 kVA.

Swansea Refrigeration Factory

By arrangement with the Government a large factory is to be built for the Pressed Steel Co., Ltd., at Swansea. This repeats the action taken by the company in 1947 when it helped to relieve unemployment by occupying a Government sponsored factory near Glasgow.

It is expected that 2,000 will be employed at the Swansea factory within 18 months of occupation and that the labour force will increase to about 4,000 over the following four to five years. The factory is expected to be completed during the spring of 1960 and the company will then transfer by stages the whole of its Prestcold Refrigeration Division which is at present divided between the Cowley and Theale factories. It is intended that all employees at the two factories now engaged on refrigeration will be employed in the company's expanding Motor Car Body Division, except for the key personnel required at Swansea who will be transferred on a voluntary basis.

Besides Prestcold refrigeration equipment, additional domestic appliances will be produced during the next few years bearing the same trade name.

New Channel Islands Cable

Last week H.M.T.S. *Ariel* started laying a new Post Office submarine cable between Tuckton, near Bournemouth, and St. Helier which will double the telephone circuit capacity to the Channel Islands and also provide a more direct route to London. The cable is coaxial, with polythene insulation, and the route length is 130 nautical miles.

Batti-Wallahs' Society

Captain R. H. J. Wallis of the cable ship *Alert*, who was to have been the guest speaker at last week's luncheon of the Batti-Wallahs' Society, was unable to attend and in his absence, Mr. H. H. Spencer, the president of the Society, successfully stepped into the breach. Mr. Spencer has paid two business trips to China, and in an impromptu address he gave some of his impressions of the rapid development of modern China. Mr. T. C. F. Bigland (the "Mate") announced that the next luncheon would be held on Wednesday, 30th July, when the guest speaker would be Sir Roy Gill, master of the *Cutty Sark*.

Training Technical College Teachers

Teachers in technical colleges are to have new opportunities for full-time training while in service. This is announced in a memorandum sent to local education authorities by Mr. Geoffrey Lloyd, Minister of Education. The first courses will be held in the summer of 1959 at each of the three technical training colleges at Bolton, Huddersfield and London (Garnett

Last week the Mayor of Pittsburgh (Mr. D. L. Lawrence) visited the works of South Wales Switchgear, Ltd. In the photograph Mr. Lawrence (centre) and, from left to right, Mr. James (works convenor), Mr. H. A. Lamb (general manager, Aberdare Cables), Councillor T. J. Lloyd (Mayor of Merthyr) and Mr. A. J. Nicholas (managing director, South Wales Switchgear) are inspecting one of the 33 kV circuit-breakers under construction for Trinidad

College). Courses will last ten weeks and will cater for both day and resident students in engineering, building, commerce and other subjects. Technical college authorities are being asked to release staff on full salary. Tuition will be free and travelling expenses will be payable. From next September travelling expenses will also be paid to school teachers who attend deferred courses of further training (supplementary and advanced courses).

Computer for Nuclear Power Problems

The first "Emiac II" general-purpose analogue computer, made by E.M.I. Electronics, Ltd., has been delivered to the Hawker Siddeley Nuclear Power Co. at Slough. The computer, which has now gone into full-scale production at the Hayes factory of E.M.I., will be used by Hawker Siddeley to study nuclear reactor problems.

French Transatlantic Telephone Cable

Last week the first 12-mile section of a telephone cable between France and the United States was laid off the west coast of Brittany. The Paris correspondent of *The Times* says that when the operation has been completed, by the end of next year, France will have a double cable to Canada 2,500 miles long with a link to the United States. There will be 36 circuits, of which 13 will be reserved for France, 13 for Germany and 10 for other European countries.

C.W. Screens for Nuclear Stations

Orders recently received by F. W. Brackett & Co., Ltd., for automatic travelling band screens for screening condenser cooling water include six screens for Berkeley nuclear power station, eight for Hinkley Point and eight for Hunterston. In addition, two nuclear power stations will be equipped with a considerable number of Brackett self-cleaning twin strainers.

Cooling Towers for Rugeley Station

Film Cooling Towers (1925), Ltd., has received an order from the Central Electricity Generating Board for four natural draught cooling towers for Rugeley generating station, Staffs. The contract, the value of which is more than £750,000, will be carried out in collaboration with J. L. Kier & Co., Ltd.

G.E.C. University Scholarship Awards

The first ten scholarships under a new university scholarship scheme have been awarded by the General Electric Co., Ltd. The scheme is an extension of the university sandwich course of professional training already run by the company. Successful candidates for the scholarships, which are worth £400-£450 a year, are in the main students unable to qualify for financial help from county or State awards. They will spend three years at university and receive two years' industrial training, with remuneration, within the company's organisation before taking up a staff appointment.

Mr. Jules Thorn, chairman and managing director of Thorn Electrical Industries, Ltd., laying the corner stone of Thorn House in Upper St. Martin's Lane, London, W.C.2, on 25th June. With him is Professor Basil Spence

Cook Strait Trial Cable Laid

The length of submarine power cable manufactured by the B.I.C.C. Group for trials in the Cook Strait has now been laid. On 31st May, under the control of engineers from British Insulated Callender's Construction Co., Ltd., the trial length was laid by the cable-ship N.Z.G.S. *Matai* seawards from Oteranga Bay, which is on the North Island shore of Cook Strait south of Cape Terawhiti. The cable is anchored and will be allowed to remain on the sea bed for as long as possible.

Half a mile in length and with an overall diameter of 5in, the cable is of the single-core pre-impregnated high-pressure gas-filled type and is designed for 250 kV d.c.

Motor Control Equipment Order

Through its New Zealand agents (Tolley & Son, Ltd.), the Igranic Electric Co., Ltd., has obtained an order valued at about £50,000 for the supply of centralised motor control panels and auxiliary control boards for a freezing plant at Invercargill. Delivery of the equipment, which embodies several new design features and components, is scheduled for early next year.

New Thorn Offices

A public garden will be one of the many unusual features of Thorn House, the corner stone of which was laid on 25th June by Mr. Jules Thorn, chairman and managing director of Thorn Electrical Industries, Ltd., at a small private ceremony on the site. Among the guests was Professor Basil Spence, president-elect of the Royal Institute of British Architects, whose firm designed the building.

The garden, with specially planted fully grown trees, shrubbery and electrically heated flower beds, will form the ground floor of the 185ft high office block at the corner of Upper St. Martin's Lane and West Street, W.C.2. The tower block, with twelve upper floors, will be supported 20ft above ground level on eighteen reinforced concrete pillars, and a long showroom forming the two lower floors will extend horizontally along the frontage to Upper St. Martin's Lane.

At present the framework of this £1,000,000 all-electric building is up to two floors.

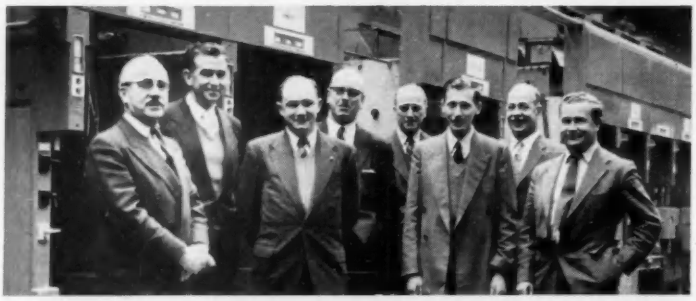
Illuminated Sign Patents

A number of firms who manufacture and install illuminated signs of all types have formed themselves into a group under the title of Sign Patents Advisory Association, Ltd., for the purpose of acting jointly in questions of common interest relating to sign patents. At present, sixteen companies are members of this Association and several more are likely to be admitted to membership shortly. Any company which is active in the field of illuminated signs is eligible for membership.

The member firms have established the Association because of their serious concern at the position which has existed in the past. Pending patents have not been given co-ordinated consideration by the industry and, in some cases, although there were sound reasons for doing, no objection has been lodged.

E.A.W. Egg Cookery Competition

The finals of the National Egg Cookery Competition, organised by the Electrical Association for Women in conjunction with the British Egg Marketing Board, were held in Fulham Town Hall on 26th June. The twelve contestants, area winners from 118 E.A.W. branches who had taken part in preliminary contests in various parts of the country, were required to cook a *soufflé* in public on an electric cooker. The result was a win for Mrs. D. Hammond, a member of the Walsall E.A.W. Branch and formerly an electrical housecraft adviser with the Midlands Electricity Board. She received a prize of £100, to be spent on electrical equipment of her own choice. Mrs. K. H. Rowland (Watford Branch) was placed second and Mrs. G. E. Bradburn (Chorley Branch) was



A number of sales managers and engineers from overseas have recently been engaged on an intensive study course on new developments at the Hebburn Works of A. Reyrolle & Co., Ltd. The photograph shows (left to right) Mr. F. N. Prangnell (Calcutta), Mr. I. Ashe (Sydney), Mr. A. S. Bridger (Johannesburg), Mr. W. G. Martin (deputy overseas manager at Hebburn), Mr. W. E. Fleming (Buenos Aires), Mr. P. R. Rosen (Johannesburg), Mr. J. F. Bird (Salisbury), and Mr. E. P. Siddall (Lagos). Mr. R. K. Edgley (Sydney) was also a member of the course

third, receiving £50 and £25, respectively.

The prize money, given by the British Egg Marketing Board, was presented by Mr. R. Chalmers Watson, publicity chairman, B.E.M.B., in the presence of the Mayoress of Fulham, Mrs. L. G. Fenton. Lady Swaythling, O.B.E., immediate past-president, E.A.W., was in the chair.

The London Electricity Board supported the finals by arranging a special display of electrical cooking equipment in the Town Hall from 23rd to 26th June and were also responsible for the electric cookers and food mixers used by the competitors.

Gas Turbine for Russia

An order for the first British industrial gas turbine for Russia has been secured by Ruston & Hornsby, Ltd. Rated at 1,000 kW, this Mark TA turbine will be used in conjunction with a generator and mounted on a special rail wagon to provide a mobile electric generating plant.

U.S.–Euratom Agreement

Details were published last week of a proposed agreement between the United States and Euratom under which it is expected that six to eight reactors of types approved in the United States will be built in Euratom countries. The programme provides for the installation of about 1,000 MW of capacity by 1963 at a cost of $350 million, of which $135 may be covered by long-term credits to Euratom by the United States Government. In addition there would be a ten-year joint research and development programme involving an expenditure during the first five years of $100 million, half of which would be contributed by the United States.

Dollar Order for Furnaces

Wild-Barfield Electric Furnaces, Ltd., has recently received from the United States an order for twenty-eight 750 lb capacity mains frequency induction heated aluminium holding furnaces valued at nearly $300,000. This order was received despite severe competition from American furnace manufacturers.

Batteries for British Railways

The British Transport Commission has placed an order with Tungstone Products, Ltd., for the supply and erection of 182 lead-acid batteries (88 of 55 cells and 94 of 24 cells) of varying capacities and the appropriate charging equipments for the British Railways electrification programme. The batteries will be used to provide low voltage d.c. supplies for remote supervisory control circuits, and for operating switchgear controlling high voltage a.c. supplies from the grid, and switchgear at intermediate points along the lines to be electrified to section electrically the overhead track equipment.

In the Hotpoint national dealer refrigerator display contest the first prize of £100 was won by Mr. G. D. Fletcher (Owen Owen, Ltd., Liverpool) for this display on the "space-planned" theme. The second prize of £50 was won by York Co-operative Society Display Department and the third prize of £25 by Mr. T. Henderson (Binns, Ltd., Liverpool). There were five £5 consolation prizes

Recovery Scheme for C.R. Tubes

Siemens Edison Swan, Ltd., has arranged to operate a scheme for the recovery of certain types of cathode ray tubes. The scheme will include a number of selected tube types from 12in to 21in.

Trade Announcements

Crompton Parkinson, Ltd.—From 12th July the telephone number of the Supplies Depot, Portsmouth, will be Portsmouth 26555. This depot serves Hampshire, West Sussex and the south coast of England from Brighton to Poole.

E. K. Cole, Ltd.—Mr. S. S. Galloway has been appointed as technical sales representative, Ekco Heating Department, for Lancashire, Cheshire, North Wales, Cumberland and Westmorland. He will operate from the company's Manchester depot, 115, Jersey Street, Ancoats (Collyhurst 4421).

Mr. A. H. Baker has joined the sales staff of the **A.E.I. Lamp & Lighting Co., Ltd.,** at its Northampton office. For the last eight years he has been lighting sales representative based on Luton.

Electro-Medical Supplies (Greenham), Ltd., have changed their name to **C. H. Greenham & I. C. Greenham, Ltd.**

Utilities (London), Ltd., have moved into a new works at Morden Road, Mitcham. Their office address has changed from Brixton Road to Tunstall Road, Brixton, London, S.W.9 (telephone: Brixton 6811-2-3).

British Electrical & Manufacturing Co., Ltd.—The London branch has been transferred from Berners Street to larger premises at 12, Dyott Street, W.C.1, near Tottenham Court Road Tube Station. (The trade counter is reached from Bucknall Street.) Increased storage space allows large stocks to be maintained, in particular of all types of switchgear. A well-equipped showroom is at present being added. The telephone number is Temple Bar 3727.

Crofts Engineers (Holdings), Ltd., announces the opening of a subsidiary company, Crofts U.S.A., Ltd., with headquarters in Chicago.

Change of Name

Aero Research, Ltd., Duxford, Cambridge, is changing its name to CIBA (A.R.L.), Ltd. The trade names of "Aerolite," "Araldite," "Redux" and other proprietary products are unaffected. The change of name of the company will take effect on 30th June.

OVERSEAS ELECTRICAL TRADE

Canada the Leading Market for British Generating Plant

IN the majority of categories of electrical exports the figures for May last were rather less favourable than a year ago but, except for cables, the reductions were generally not much greater than the normal month-by-month fluctuations. Some falling-off was to be expected because Whitsun fell in May this year whereas last year it occurred in June, and a hold up of shipments is also likely to have been caused by the London dock strike. The Board of Trade returns show that the aggregate value of British exports of electrical equipment in May was £19·3 million against £21 million in the corresponding month of 1957. In April this year exports amounted to £18·8 million, but this was, of course, below the monthly average because of the Easter holidays. So far this year —to the end of May—£96·5 million worth of equipment has been exported, an increase of £1·4 million over the corresponding period of last year (see Table I).

Exports of generators, motors, etc., were again the

TABLE I.—ELECTRICAL EXPORTS

Class	Month of May, 1958	Five months ended 31st May, 1957	Five months ended 31st May, 1958
	£	£	£
Generating sets and generators:			
Diesel-driven, up to 10 kW	115,069	769,171	681,132
Ditto, 10 to 65 kW	167,600	855,739	907,695
Ditto, 65 to 200 kW	243,985	558,786	1,006,418
Ditto, over 200 kW	747,114	1,350,492	2,106,792
Spark ignition engine driven	62,034	80,548	110,461
Steam turbine driven	68,691	255,246	380,180
Hydraulic turbine driven	—	—	—
Other prime mover driven	22,796	158,083	71,704
Generators, not exceeding 200 kW	71,751	784,558	657,190
Ditto, over 200 kW	81,384	410,815	453,055
Parts of generators	944,550	1,971,158	4,163,560
Motors, complete, other than railway, tramway and trolley-bus:			
Up to ½ h.p.	191,498	1,006,357	802,190
Over ½ but under 1 h.p.	49,718	238,370	289,161
1 h.p. to 250 h.p.	514,573	2,500,146	2,487,509
Over 250 h.p.	65,015	534,137	542,720
Railway, tramway and trolley-bus motors complete and parts of all motors	317,824	902,887	1,204,905
Motor starting and controlling gear	277,077	1,623,709	1,386,804
	3,940,679	14,000,202	17,251,476
Converting machinery	15,760	353,171	167,448
Mercury-arc rectifiers	155,592	325,504	570,502
Transformers for lighting, heating and power (incl. coils):			
Not exceeding 7,500 kVA	612,605	3,305,199	3,312,001
Over 7,500 kVA	388,293	927,893	1,877,619
Switchgear and switchboards (not telegraph or telephone), up to 200 A and 660 V	317,640	1,591,537	2,144,724
Ditto, other	1,099,228	5,730,926	5,219,380
	2,589,118	12,234,230	13,291,674
Primary batteries:			
Lighting	92,738	517,070	453,743
Radio	321,400	1,373,644	1,471,015
Other	43,687	209,848	231,833
Parts (excl. carbons)	51,329	273,990	237,818
Lamps:			
Filament, exceeding 28 V	97,500	459,069	455,497
Ditto, under 28 V	27,206	158,756	142,267
Arc lamps and searchlights	39,630	70,627	102,588
Discharge lamps, fluorescent tubes, etc.	90,635	480,190	443,069
Radio and television, etc., apparatus:			
Thyratrons, hot cathode mercury vapour and gas-filled rectifiers (excl. mercury-arc rectifiers), photo-electric cells, stabilising and cold cathode valves, magnetrons, klystrons	24,369	121,806	139,626
All other	348,686	1,439,253	1,700,566
Parts (excluding glass bulbs)	17,410	61,669	85,090
Radio and television transmitters	8,365	263,037	225,761
Commercial radio and radar equipment	917,502	6,275,639	6,039,045
Domestic radio receivers, mains	87,704	579,920	443,538
Ditto, battery	67,374	305,090	280,919
Ditto, other (incl. car)	18,553	137,431	122,288
Radiograms	22,571	133,445	180,393
Television sets	84,110	303,930	604,273
Public address equipment	82,777	480,478	523,219
Other radio and television apparatus, n.e.s.	36,688	247,232	154,694
Components and parts, n.e.s.	700,561	3,939,419	3,771,351
	2,416,670	14,288,349	14,270,763
Telegraph and telephone installations	648,404	3,383,838	4,059,993
Telephone instruments, separately consigned	141,307	780,445	975,439
Telegraph and telephone parts	734,969	4,142,192	3,788,717
Line apparatus for long distance communication	130,618	654,936	912,636
	1,655,298	8,961,411	9,736,785

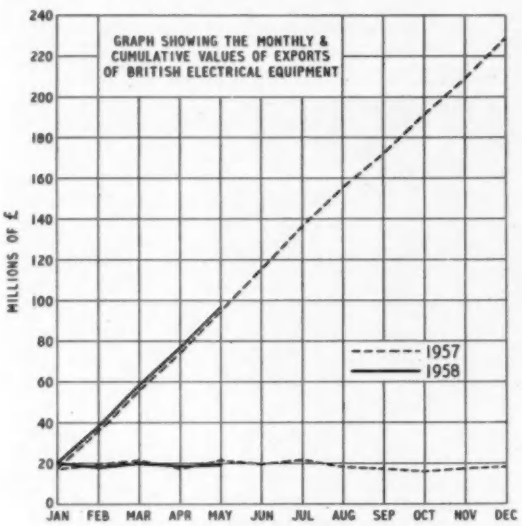
Class	Month of May, 1958	Five months ended 31st May, 1957	Five months ended 31st May, 1958
	£	£	£
Cookers	58,460	332,378	263,861
Toasters	14,874	89,681	107,893
Other cooking apparatus	28,960	157,349	180,696
Parts and accessories	47,959	359,888	286,782
Space heating appliances	24,160	177,370	201,797
Water heating appliances	32,477	166,451	145,259
Other heating appliances	21,946	205,963	195,843
Parts and accessories	94,151	306,903	330,901
Irons	73,576	340,505	403,817
Arc welding equipment, a.c.	77,944	286,055	430,556
Ditto, d.c.	87,868	265,862	283,105
Resistance welding equipment	15,560	111,014	72,977
Electric furnace plant	124,360	472,513	432,388
Magnetos, ignition	12,945	163,430	80,948
Sparking plugs	192,524	807,134	776,575
Elec. appliances for aeroplanes, n.e.s.	264,646	1,376,066	1,367,070
Ditto, for motor vehicles, n.e.s.	381,824	1,804,680	2,048,662
Ditto, for cycles, n.e.s.	50,803	297,447	276,626
Signalling app. (incl. traffic signals)	119,418	576,667	781,180
Instruments, commercial	231,791	926,687	935,743
House service meters (including parts)	119,101	781,945	778,311
Electro-medical apparatus (not X-ray)	90,449	214,550	266,667
X-ray apparatus (excl. tubes and valves)	56,707	365,115	296,191
Vacuum tubes	66,423	239,313	253,954
Ceiling fans, complete	127,767	591,062	549,930
Desk fans, complete and parts of desk and ceiling fans	24,472	177,860	131,485
Vacuum cleaners	135,259	785,959	724,518
Floor polishers	78,056	428,478	358,277
Food mixers	54,812	232,271	275,334
Hair clippers and dry shavers	83,614	432,978	285,087
Other portable appliances	16,930	144,026	98,813
Parts	112,315	660,165	576,495
Portable elec. tools (not saws) and parts	232,954	1,105,426	1,151,018
Cables and wires:			
Telegraph and telephone, submarine	180,234	1,642,442	425,474
Ditto, other	482,148	4,977,267	2,802,079
Cotton, silk or art. silk insulated	64,673	199,107	249,706
Enamel, glass or asbestos insulated	86,174	500,620	381,376
Paper insulated	586,000	4,266,737	3,144,212
Rubber insulated	458,823	2,858,847	2,515,467
Thermoplastic insulated	214,110	866,085	1,051,773
Other	215,506	966,461	1,187,370
	2,287,668	16,277,566	11,757,457
Accumulators for motor vehicles	216,324	761,658	837,301
Ditto, traction	19,773	146,745	115,872
Ditto, radio and other portable	47,014	417,929	264,833
Ditto, other	25,283	163,709	132,936
Parts and accessories	120,720	413,998	578,097
Electric wiring accessories	178,276	234,960	769,291
Elec. porcelain, etc. (incl. insulators), n.e.s.	146,786	556,325	549,410
Insulating cloth and tape	47,600	311,371	246,769
Other insulating material	99,368	464,182	473,557
Permanent magnets	50,771	234,653	261,976
Radio, telegraph and telephone testing equipment, n.e.s.	74,304	340,869	330,598
Scientific elec. instruments (not telegraphic or telephonic):			
Time recorders and time switches, complete	35,940	62,822	159,361
Other	404,261	1,516,887	1,776,564
Electrical machinery, n.e.s.	74,998	363,385	381,034
Electrical apparatus and appliances, n.e.s.	967,248	4,443,310	4,429,363
TOTAL	19,317,329	95,120,946	96,501,706

TABLE II.—DISTRIBUTION OF EXPORTS OF ELECTRICAL MACHINERY, APPARATUS AND APPLIANCES

Country	Month of May, 1958	Five months ended 31st May, 1957	Five months ended 31st May, 1958
	£	£	£
Channel Islands	167,403	439,785	551,821
Gibraltar	68,677	61,243	192,751
Malta and Gozo	96,048	312,644	381,187
Cyprus	51,087	665,702	441,110
Sierra Leone	76,411	172,848	308,265
Ghana	125,529	936,926	745,299
Nigeria	368,258	1,453,899	1,791,862
Union of South Africa	1,524,884	7,336,497	8,696,823
Rhodesia and Nyasaland	360,566	2,458,689	2,187,434
Tanganyika	58,550	311,799	260,407
Kenya	121,281	1,330,521	700,267
Uganda	67,651	568,271	333,485
Mauritius	34,642	183,929	196,649
Aden	50,261	253,284	296,236
Bahrain, Qatar and Trucial States	65,958	746,121	457,674
Kuwait	149,754	1,271,626	844,822
India	1,590,326	10,478,142	7,939,041
Pakistan	216,488	1,471,779	1,232,450
Singapore	393,787	1,714,195	1,701,551
Federation of Malaya	323,993	1,554,758	1,486,506
Ceylon	229,935	697,898	760,103
British North Borneo	15,751	115,593	112,217
Sarawak	23,438	127,702	107,823
Hong Kong	302,915	1,116,116	1,549,000
Australia	1,352,656	8,099,661	8,530,302
New Zealand	1,154,675	4,633,657	5,928,837
Fiji	16,542	98,548	124,620
Canada	1,746,558	5,240,031	6,163,625
Jamaica	142,174	468,805	701,993
Barbados	24,222	96,169	138,824
Trinidad	131,355	620,255	603,526
British Guiana	51,196	212,074	270,477
Other Commonwealth countries	146,246	527,516	884,504
Irish Republic	291,245	1,105,180	1,440,877
Soviet Union	68,097	839,265	232,834
Finland	137,786	627,792	682,425
Sweden	349,063	1,821,221	2,267,047
Norway	171,638	1,010,613	1,080,457
Denmark	197,482	1,047,078	936,602
Poland	75,968	195,071	373,243
Western Germany	279,537	1,085,961	1,367,894
Netherlands	680,496	3,515,216	3,122,944
Belgium	229,000	1,681,330	1,528,247
France	181,340	1,929,027	1,837,628
Switzerland	196,065	610,098	796,856
Portugal	240,219	1,282,997	1,763,192
Spain	220,662	1,825,174	847,003
Italy	314,858	1,603,537	1,479,948
Austria	25,412	173,572	228,822
Yugoslavia	73,598	247,158	277,614
Greece	69,637	645,984	438,839
Turkey	146,905	234,297	653,308
Belgian Congo	44,434	232,838	195,403
Portuguese East Africa	25,364	153,134	123,158
Egypt	152,288	1,824	521,060
Libya	50,390	189,088	286,937
Southern Morocco	52,634	183,010	169,329
Sudan	122,705	480,667	464,656
Syria	32,159	184,674	126,175
Lebanon	56,717	176,882	290,981
Israel	94,125	379,748	517,515
Jordan	91,886	373,993	406,101
Saudi Arabia	84,742	285,193	405,728
Iraq	488,516	1,267,128	1,552,515
Iran	474,395	1,791,548	1,851,082
Burma	50,255	339,264	343,677
Thailand	129,170	481,675	813,245
Indonesia	13,343	271,039	174,825
Japan	47,269	405,179	236,700
United States of America	578,409	5,046,269	2,909,800
Cuba	110,171	213,048	468,051
Mexico	54,994	263,531	270,768
Colombia	25,913	232,903	216,846
Venezuela	357,472	1,465,608	1,954,772
Peru	37,361	306,492	183,856
Chile	44,717	218,577	187,127
Brazil	57,194	463,630	509,731
Uruguay	383	102,070	12,639
Argentine Republic	548,834	468,767	1,694,956
Other foreign countries	293,264	1,885,913	1,636,802
TOTAL	19,317,329	95,120,946	96,501,706

most satisfactory feature of the month's figures, with Canada as the leading buyer (£707,253 against £190,287 in May, 1957). The month's total for this class of equipment was up by over a million pounds and in the first five months of the year the value of such exports expanded by nearly £3¼ million; this included plant to the value of £2·4 million supplied to Canada, compared with £1·4 million in the first five months of 1957. Exports of transformers, switchgear, etc., also improved both in May and for the period January to May.

There was some falling-off in exports of most types of radio, telegraph and telephone apparatus and in the case of domestic appliances such as cookers, water heaters and the like the general decline was unrelieved except for one item—"parts and accessories."



Mention has already been made of the reduction in cable exports; the total of £2,287,668 for May was only about half as much as in the same month last year (£4,535,325). The reason for this was mainly that the 1957 figure was "weighted" by a large shipment of telegraph and telephone cables to the United States (in May this year cable exports to the U.S.A. amounted to £27,459 as compared with £1,708,186 in the same month of 1957).

In addition to the classes of equipment given in Table I and whose distribution is analysed in Table II, other types of electrical goods shown in the returns include the following:—

Electric locomotives: May, £309,847; five months (January-May), £1,351,407 (against £1,999,455).

Locomotives with i.c. engines and electrical transmission: May, £262,284; five months, £718,192 (£471,399).

Electrically-operated washing machines, complete, not exceeding 150 lb net weight: May, £677,133; five months, £2,135,593 (£1,559,278). Ditto, 150-250 lb: May, £102,976; five months, £414,680 (£537,499). Parts: May, £104,183; five months, £366,746 (£301,654).

Welding electrodes: May, £131,428; five months, £637,235 (£618,632).

Electric conduit tubes and cased tubes: May, £61,537; five months, £296,363 (£422,819).

Electric carbons (including parts): May, £61,599; five months, £263,028 (£276,732).

Electric lighting fittings and lanterns (excluding arc lamps, searchlights, and lamps for road vehicles): May, £337,902; five months, £1,476,632 (£1,056,061).*

Other electric lighting appliances (excluding vacuum tubes and lamp bulbs) and fittings and parts, n.e.s.: May, £36,849; five months, £363,848 (£1,254,960).*

Electrical imports in May amounted to £2,486,081, as compared with £2,338,672 in April and £2,430,145 in May, 1957. The total for the first five months of this year was £11,724,220 (against £10,840,252 for January-May, 1957).

* The figures for 1958 are not completely comparable with those for previous years.

Earth Continuity Tester

CONSTRUCTIONAL DETAILS OF INSTRUMENT FOR INSTALLATION INSPECTORS

By IRA TOOP

Fig. 1.—The completed earth continuity tester

FOR many years the need has been apparent for a simple instrument to test the efficiency of the earthing of electrical installations. The minimum requirements for such an instrument are that it should measure the total impedance of the neutral-earth loop circuit; check the effectiveness of the earthing conductor in flexible cords, etc.; and check for correct installation of three-pin general purpose outlets. It should be of small dimensions, light in weight, safe to use, and simple to operate.

A tester has been constructed which embodies these features. It measures 8in by 4in by 4in and weighs approximately 4½ lb. The tester is contained in a wooden case and the dimensions and weight enable it to be held in one hand while testing is in progress. When a large number of three-pin outlets and/or pieces of apparatus are to be tested the instrument is mounted in a light cradle strapped to the chest of the inspector, which leaves both hands free and speeds up the work of testing. Particular care has been taken to double-insulate all wiring at mains voltage and the wooden case assures additional safety at all times.

Fig. 1 illustrates the completed tester and shows the simplicity of the layout. The primary purpose of the tester is to check the impedance of the loop circuit from the earth pin of a three-pin general purpose outlet via the earth circuit to the supply transformer and return through the neutral conductor, which circuit is substantially the same value as the true earth fault circuit via the active conductor.

G. F. Tagg has shown that the true impedance approximates to the resistance value. Examination of the circuit diagram in Fig. 2 will show that the tester has the further uses discussed below.

When checking a three-pin general purpose outlet the following procedure is adopted:—

(*a*) With the G.P.O. switch in the "off" position, plug the instrument into the general purpose outlet. If the switch is correctly wired in the active conductor the tester is "dead" until the outlet switch is "on." However, if the switch is incorrectly wired in the neutral conductor the neon indicator glows and the relay "growls" softly while the switch is still "off."

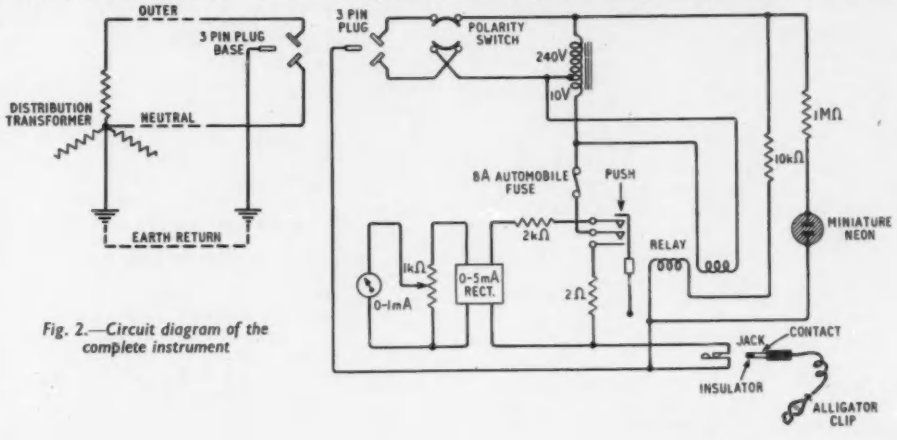


Fig. 2.—Circuit diagram of the complete instrument

If the earth wire to the plug is open-circuited the neon indicator glows dimly and the relay "growls" softly, but the press-button is ineffective and the meter will not indicate.

If the active conductor is wrongly connected to the earth pin of the general purpose outlet the neon glows and the relay "growls" softly, but the press-button is ineffective and again the meter will not indicate. It is seen that the tester will not operate normally if the active conductor is incorrectly connected.

Fig. 3 shows that the relay is not a conventional contact breaking device. The armature of the relay operates a masking piece which prevents the press-button from being depressed unless both sections of the relay winding are energised. Before the press-button is effective, therefore, the active, neutral and earth must be connected and the instrument correctly polarised.

Interlocking Arrangement

A simple interlocking device prevents the operation of the polarity switch while the press-button is depressed. The rotating member of the polarity switch is square, one side of which must be parallel with a mating piece attached to the press-button shaft. When the press-button is "up" the mating piece clears the square of the polarity switch and allows it to turn freely. But if the press-button is depressed the polarity switch is prevented

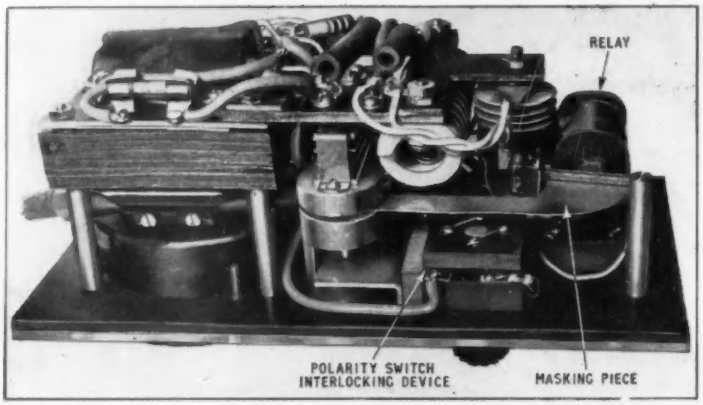


Fig. 3.—It can be seen that the relay is not a conventional contact breaking device

from turning; furthermore, the press-button cannot be operated unless the polarity switch is correctly located in any one of its quadrant positions.

As a further protection an 8 A automobile type fuse is included in the low-voltage circuit. This is desirable in case the frame of a piece of apparatus is " alive " to earth when using the wandering earth lead.

It will be noted that the wandering earth lead and " alligator " clip is safe to handle at all times since it cannot be " alive " to earth even if the three-pin plug is incorrectly wired.

Assuming the wiring is correct, earth loop testing is proceeded with.

(*b*) With the power point switch in the " on " position, the polarity knob is rotated until the neon glows normally and the relay " growls " loudly. It will be noted that the press-button is ineffective until the polarity is correctly made.

(*c*) The press-button is pushed to the first stop and the " adjust " knob turned until the meter reads point " A " on the dial, which corresponds to full-scale deflection of the meter. This procedure compensates for any neutral-to-earth voltage which is summated with the injected voltage of the transformer secondary.

(*d*) The press-button is pushed hard down and the meter indicates the earth loop resistance directly in ohms.

If it is desired to check the earth conductor on a portable apparatus connected by means of a flexible cord, the three-pin general purpose outlet should first be checked. The wandering lead " alligator " clip is then connected to the frame of the apparatus and the jack plugged into the instrument. The flexible from the apparatus may now be plugged into the double-adaptor plug on the flexible cord of the instrument and normal impedance testing procedure carried out. This method is particularly useful for checking the effectiveness of the earthing of apparatus employing long lengths of flexible cord, such as lawn mowers and rollers on bowling greens.

When an inspector wishes to check the earthing of out-of-reach apparatus, such as luminaires, a contact prod on the end of a rod connected to the wandering earth lead of the instrument is employed.

When an installation gives a doubtful reading, experience has shown that the faulty part is usually easy to locate, using the wandering lead to isolate the faulty section.

A number of cord adaptors and connectors covering the range of general purpose outlet types enables the instrument to be used on all installations. When a general purpose outlet is not available a three-pin cord connector may be used having a flexible cord with clip-on terminals for connecting to any source of 240 V, 50 c/s supply. This method is particularly suitable when checking the earthing on switchboards.

The instrument circuit values are arranged so that doubtful earth readings on a normal 15 A circuit are spread over the centre of the dial of the indicator. The dial is marked in colours for ease of reading. It will be noted that by using suitable resistance and voltage values the instrument may be designed to indicate any range of values with a reasonable degree of accuracy.

The instrument transformer is designed for short-term rating, having a core $\frac{3}{4}$in by $\frac{11}{16}$in in cross-section. For this reason the instrument is subject to errors, due to regulation of the transformer combined with neutral-to-earth voltage and supply voltage variations. However, the errors involved are usually small and it was never anticipated that a high degree of accuracy was necessary.

The instrument was primarily designed to be used by installation inspectors. The amount of time saved on inspections has been considerable, particularly in cases of large installations involving many general purpose outlets and pieces of apparatus. Inspectors can simply and easily get actual readings of earth resistance and a check on the plug wiring which engenders confidence, or otherwise, in the installation.

Acknowledgment is due to the Electricity Trust of South Australia for permission to publish the information contained in this article and to the help given by officers of the Trust, particularly Messrs. F. W. H. Oxer and H. R. Adamson.

Australian News

THE N.S.W. Electricity Commission is to establish high frequency radio communication channels between its system control centre in Sydney and the Snowy Mountains hydro-electric control station at Cabramurra. Initially, the communication channels will be superimposed on the Commission's power lines for the greater part of the distance and partly by direct radio beams between 150ft high towers. The power line carrier sections will be those already operating between Sydney, Tallawarra and Goulburn, and those to be installed on the new 330 kV transmission line now being built by the Commission from Yass to the Upper Tumut area of the Snowy Mountains. It is anticipated that direct radio communication will ultimately be established over the whole distance, and also with the Victorian Electricity Commission's control centre in Melbourne.

Four men were killed instantly when a lift they were in fell 400ft down a shaft at the Snowy Mountains hydro-electric undertaking. The men were employees of a French company which is building the T1 power station on the Tumut River. The accident occurred at Kenny's Knob, 70 miles from Cooma. The lift is one of two used to lower men and material into a tunnel from the Tumut River to the power station. The cage, which is about 5ft square, is believed to have been near the top of the shaft when the lift failed. Project T1 is a major work of the Snowy Mountains hydro-electric scheme. It includes the construction of an underground power station in a cavern 1,195ft below the surface.

GENERATION AND DEVELOPMENT

Purchase Tax Representation

A proposal that purchase tax should be removed from gas and electric space heaters is being made to the Chancellor of the Exchequer by the Metropolitan Boroughs' Standing Joint Committee, which represents London Borough Councils. The committee is also urging the removal of hire purchase restrictions on this type of equipment.

This action follows a report from Southwark Borough Council stating that both gas and electric heating appliances are particularly suitable for use in smoke control areas and householders should not be discouraged from purchasing them.

Underfloor Heating for Bristol Flats

For the first time electrical underfloor heating is to be installed in Bristol Corporation flats. This system will be incorporated in buildings which will provide 213 dwellings, at West Camp, Penpole, Bristol. The estimated cost of the scheme is £42,600 against £64,685 for installing an oil-fired central heating system. Estimates showed that the cost to the tenants would be £11 to £13 during the autumn and winter quarters, about £5 10s for the April-June quarter and £1 16s in the July-September period. To meet the difficulty of the high winter charges the South Western Electricity Board has offered to sell stamps which could be purchased during the summer and credited against the winter bills.

Presentations to Consumers

The 50,000th family in the Bath District of the South Western Electricity Board to receive a supply of electricity were presented with an electric cooker on 11th June. Making the presentation, the Mayoress (Mrs. Hugh Roberts) said that electricity had helped to bring about a social revolution. Mr. R. W. Steel, manager, Bath District, spoke of the progress of electrical development in the city and said that 35 consumers out of every 100 now had electric cookers while 42 in every 100 had electric water heaters of one kind or another.

The 50,000th consumer in the Hertford District has recently been connected by the Eastern Electricity Board and the local manager, Mr. W. H. Hatton-Ward, marked the occasion by presenting the householder concerned with an electric kettle.

Modernised Showroom

In order to enlarge the display area and to obtain a modern appearance, the Eastern Electricity Board has carried out some alterations to its showroom in High Street, Bedford, and last week the acting sub-area manager, Mr. F. C. Orchard, invited the Mayor, Alderman A. A. Jones, to inspect the premises. By placing the showroom supervisor's office and accounts counter at the extreme end of the showroom, and removing existing cross walls and staircase, a large unobstructed through - display area has been provided. The work was carried out under the supervision of the Board's architect, Mr. J. W. Lee.

The Eastern Electricity Board's Bedford showroom

Oxford Buildings to be Floodlit

Floodlighting of many Oxford buildings from 11th July to 30th September is being arranged by the City Lighting Committee. The Committee has included £500 in the estimates to cover the cost.

Bellshill Reinforcement

The South of Scotland Electricity Board has approved a scheme, estimated to cost £46,500, for the reinforcement of supply to Bellshill to meet the increasing load in that area. Nine new substations are to be constructed and modifications carried out to the high voltage and medium voltage networks. The work will be completed by the end of 1960.

OVERSEAS

Development in Ceylon

Our Colombo correspondent reports that the next phase of Ceylon's hydro-electric development (Stage IIB) will begin in the near future. Tenders have already been invited for this project. Preliminary investigations for Stage III—the "Seven Virgins" project—are to be expedited with the assistance of the American International Corporation Agency. The dam site and the tail race surveys for this undertaking have been completed.

The Permanent Secretary to the Ministry of Transport has informed the Special Commissioner of the Colombo Municipal Council that it will not be possible for the Transport Board to manage the trolley-bus services because it is already occupied with the numerous problems that have arisen since the nationalisation of the bus services on 1st January.

Now that a definite decision has been made on the subject, the Special Commissioner says that he will take up with the Minister of Local Government the question of expanding the trolley-bus services in order to cut down the losses, which have amounted to over Rs. 1,000,000 a year.

Fort Portal Supply Scheme

Electricity is to be supplied in an area between the Lake Albert escarpment north of Fort Portal and Kasese in the foothills of the snow-capped Mountains of the Moon, some 200 miles from Kampala, under a scheme announced by the Uganda Electricity Board. At the outset a bulk supply will be taken from Kilembe Mines, near Kasese, and later as and when required from a local run-of-river hydro-electric project using the waters of the Muzizi River.

Paris-Lille Electrification

Electrification of the railway line between Paris and Lille will be completed by the end of this year, it was announced recently. Reporting this, the Paris correspondent of *The Times* says that within two years all the lines in the Paris-Lille-Strasbourg triangle —or the whole of north-eastern France—will be electrified. It is estimated that this will save nearly 300,000 tons of coal a year, while the time for the journey between Paris and Lille will be reduced by 25 minutes to 2 hr 10 min.

DOMESTIC ELECTRICAL EQUIPMENT

ELECTRIC FIRES

WHETHER it be required for occasional use only or as the main source of room heating, the electric fire has much that recommends it to the user, being one of the most flexible forms of space heating and the most easily controlled. Compared with other types of heating there can no longer be any question of excessive running costs, the price of electricity having advanced much less than that of other fuels.

An indication of their popularity is reflected in the number of electric fires that are now on the market, some 400 different models being listed in the following survey. The fires which continue to be most in demand are the portable reflector types, which are claimed to reach their maximum heat output within two minutes of switching on, while radiant heat is as high as 70 per cent compared with 50 per cent for the firebar types.

To these two types a third may now be added—the domestic infra-red wall-mounted heaters. With a loading of only 750 W they are economical in use and provide an excellent source of heat for the bathroom or kitchen. Among the pioneers of this form of domestic heating are Dimplex, and Englehard Industries; several other manufacturers may be found in the following survey.

Consequent upon the reduction in purchase tax rates, from 60 to 30 per cent, the prices of all types of electric fires are considerably less than twelve months ago and it is anticipated that sales this coming season will be greater than ever.

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
ARTIC FUSE & ELECTRICAL MFG. CO., LTD., Birtley, Co. Durham.	" Sunnyglow "	Portable, floodlit reflector	1¼ or 1½ kW	One 1¼ or 1½ kW rod	Gold, silver, ivory, blue or green to order	£4 16 0	£1 1 7
	" Sunglade "	Portable, floodlit reflector	2½ or 3 kW	Two 1¼ or 1½ kW rod	Gold, silver, ivory, blue or green to order	£9 7 3	£2 2 2
BELLING & CO., LTD., Bridge Works, Southbury Road, Enfield, Middlesex.	" Hotspur " 141 and 142	Portable reflector	1 or 2 kW	One or two 1 kW rod	Choice of six colours	£2 17 6 (141) £3 12 6 (142)	£0 12 8 (141) £0 16 0 (142)
	" Dinkie " 601 and 602	Portable firebar	1 or 2 kW	One or two 1 kW bar	Choice of five colours	£1 17 6 (601) £3 0 0 (602)	£0 8 3 (601) £0 13 3 (602)
	" Empire " 401E, 402E and 403E	Portable firebar	1, 2 or 3 kW	One, two or three 1 kW bar	Beige, pastel blue or green vitreous enamel	£2 16 0 (401E) £4 0 0 (402E) £5 0 0 (403E)	£0 12 4 (401E) £0 17 8 (402E) £1 2 0 (403E)
	" Solray " 151 and 152	Portable or wall mounting	1 or 2 kW	One or two 1 kW rod	Black and cream	£3 17 6 (151) £5 5 0 (152)	£0 17 1 (151) £1 3 2 (152)
	" Dainty " 226	Portable firebar	2 kW	Two 1 kW bar	Choice of four colours	£3 17 6	£0 17 1
	" Countess " 233 and 234	Portable reflector	2 or 3 kW	Two or three 1 kW rod	Choice of six colours	£5 17 6 (233) £6 15 0 (234)	£1 5 11 (233) £1 9 9 (234)
	" Modern " 228	Portable reflector	2 kW	Two 1 kW rod	Choice of four colours	£7 2 6	£1 11 5
	" Cheery " 360	Imitation coal	2 kW	Two 1 kW bar	Silver bronze or willow green	£8 2 6	£1 15 9
	" Homeguard " 155	Portable safety reflector	2 kW	Two 1 kW rod	Choice of four colours	£11 2 6	£2 9 0
	" Celtic " 753B	Period, log	3 kW	Three 1 kW bar (concealed)	Antique (rustless)	£29 15 0	£6 10 11
	" Adam " 743B	Period, coal	3 kW	Three 1 kW bar (concealed)	Armour bright (rustless)	£27 2 6	£5 19 5
	" Adam " 915 and 916	Period, firebar	2 or 3 kW	Two or three 1 kW bar	Armour bright (rustless)	£12 7 6 (915) £14 10 0 (916)	£2 14 6 (915) £3 3 10 (916)
	" Princess " 212 and 213	Imitation coal	2 or 3 kW	Two or three 1 kW rod	Choice of four colours	£10 10 0 (212) £11 10 0 (213)	£2 6 3 (212) £2 10 8 (213)
	" Princess " 212A and 213A	Imitation log	2 or 3 kW	Two or three 1 kW rod	Choice of four colours	£11 0 0 (212A) £12 0 0 (213A)	£2 8 5 (212A) £2 12 10 (213A)
	" Medieval " 640 and 640A	Imitation coal (640) or log (640A)	3 kW	Three 1 kW bar	Antique (rustless)	£15 10 0 (640) £17 7 6 (640A)	£3 8 3 (640) £3 16 6 (640A)

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
BELLING & CO., LTD., Bridge Works, Southbury Road, Enfield, Middlesex. *(continued)*	"Medieval" 639 and 639A	Imitation coal (639) or log (639A)	2 kW	Two 1 kW bar	Antique (rustless)	£13 12 6 (639) £15 7 6 (639A)	£3 0 0 (639) £3 7 8 (639A)
	"Waverley" 263 and 263P	Imitation coal, firebar	3 kW	Three 1 kW bar	Choice of three colours	£18 0 0 (263) £22 6 0 (263P)	£3 19 3 (263) £4 18 2 (263P)
	"Waverley" 264 and 264P	Imitation coal, reflector	3 kW	Three 1 kW rod	Choice of three colours	£18 17 6 (264) £22 16 0 (264P)	£4 3 1 (264) £5 0 4 (264P)
	"Melrose" 273 and 274	Illuminated, firebar (273) or reflector (274)	3 kW	Three 1 kW bar or rod	Choice of two colours	£16 7 6 (273) £16 17 6 (274)	£3 12 1 (273) £3 14 3 (274)
	"Converta" 178 and 179	Fireplace screen, firebar (178) or reflector (179)	2 kW	Two 1 kW bar or rod	Ripple bronze	£7 17 6 (178) £8 7 6 (179)	£1 14 8 (178) £1 16 11 (179)
	"Hearth" 159 and 159A	Imitation coal (159) or log (159A)	2 kW	Two 1 kW bar	Bright (rustless) or bronze	£8 10 0 (159) £10 7 6 (159A)	£1 17 5 (159) £2 5 8 (159A)
	C/1/131 and C/2/132	Panel, bronze inset	1 or 2 kW	One or two 1 kW bar	Choice of six colours (panels)	£3 5 0 (C/1/131) £4 8 0 (C/2/132)	£0 14 4 (C/1/131) £0 19 5 (C/2/132)
	C/1A/131 and C/2A/132	Panel, chromium inset	1 or 2 kW	One or two 1 kW bar	Choice of six colours (panels)	£3 15 0 (C/1A/131) £5 0 0 (C/2A/132)	£0 16 6 (C/1A/131) £1 2 0 (C/2A/132)
	F/2/133 (firebar) and G/2/133 (reflector)	Panel, bronze inset	2 kW	Two 1 kW bar or rod	Choice of six colours (panels)	£5 15 0 (F/2/133) £6 7 6 (G/2/133)	£1 5 4 (F/2/133) £1 8 1 (G/2/133)
	F/2A/133 (firebar) and G/2A/133 (reflector)	Panel, chromium inset	2 kW	Two 1 kW bar or rod	Choice of six colours (panels)	£6 10 0 (F/2A/133) £7 2 6 (G/2A/133)	£1 8 8 (F/2A/133) £1 11 5 (G/2A/133)
BERRY'S ELECTRIC MAGICOAL, LTD., Touchbutton House, Newman Street, London, W.1.	"Adjustaberry" 457	Imitation fuel	2½ kW	Two 1¼ kW bar	Armour bright	£12 10 6	£2 14 11
	"Alderberry" 110	Imitation fuel	2 kW	Two 1 kW rod	Armour bright	£20 13 6	£4 10 8
	"Berrylog" A.21/O	Imitation fuel	1½ kW	Two ¾ kW bar	Satin antique	£10 12 6	£2 6 7
	"Berrylog" A.21/S	Imitation fuel	1½ kW	Two ¾ kW bar	Satin antique	£9 18 6	£2 3 6
	"Dukesberry" 452	Imitation fuel	2 kW	Four ½ kW rod	Warm silver	£12 9 6	£2 14 9
	"Emberberry" 108	Imitation fuel	2 kW	Two 1 kW bar	Armour bright	£16 10 6	£3 12 6
	"Emberberry" 109 (with dogs)	Imitation fuel	2 kW	Two 1 kW bar	Armour bright	£19 15 0	£4 6 8
	"Homeberry" 442	Imitation fuel	2 kW	Two 1 kW rod	Warm silver	£9 18 6	£2 3 6
	"Masterberry" 444	Imitation fuel	2 kW	Four ½ kW rod	Warm silver	£15 17 6	£3 9 8
	"Masterberry" 555	Imitation fuel	3 kW	One 1 kW and one 2 kW bar	Warm silver	£16 5 0	£3 11 4

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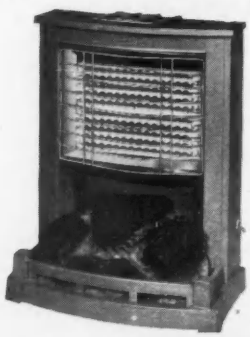

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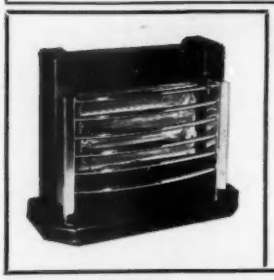
1. *Belling "Cheery" coal effect model*

2. *Berry's "Auraberry" coal effect model*

3. *Artic Fuse & Electrical Mfg. Co.'s "Sunglade"*

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
BERRY'S ELECTRIC MAGICOAL, LTD., Touchbutton House, Newman Street, London, W.1. *(continued)*	" Masterglow " 333	Illuminated radiator	2 kW	Four ½ kW rod	Warm silver	£12 10 0	£2 14 10
	" Mayberry " 441	Imitation fuel	2 kW	Two 1 kW rod	Warm silver	£13 3 6	£2 17 10
	" Minorberry " 468	Imitation fuel	2 kW	Two 1 kW bar	Beige or oyster green	£7 19 6	£1 15 0
	" Woodberry " 406	Imitation fuel	3 kW	Two 1½ kW bar	Armour bright	£16 14 0	£3 13 3
	" Adam Shell " 8	Imitation fuel	3 kW	Two 1½ kW rod	Antique bright (rustless)	£43 17 6	£10 5 4
	" Fleur-de-Lis " 40	Imitation fuel	3 kW	Two 1½ kW rod	Armour bright	£34 17 6	£8 3 3
	" Georgian " 2	Imitation fuel	3 kW	Two 1½ kW rod	Antique bright (rustless)	£37 17 6	£8 17 3
	" Jacobean " 5	Imitation fuel	3 kW	Two 1½ kW rod	Armour bright	£29 0 0	£6 15 9
	" Jacobean " 14 (with dogs)	Imitation fuel	3 kW	Two 1½ kW rod	Armour bright	£33 10 0	£7 16 9
	" Queen Anne " Pedestal 11	Imitation fuel	3 kW	Two 1½ kW rod	Antique bright (rustless)	£47 16 6	£11 3 10
	" Regency " 20	Imitation fuel	2 kW	Two 1 kW rod	Antique bright (rustless)	£37 5 0	£8 14 4
	" Wilton " 42	Imitation fuel	3 kW	Two 1½ kW rod	Antique bright (rustless)	£69 0 0	£16 2 11
	" Berrylog " A.28 (Special 36in)	Imitation fuel	—	Log effect only	—	£12 15 6	£2 19 10
	" Berrylog " A.28 (Standard 24in)	Imitation fuel	—	Log effect only	—	£9 0 0	£2 2 2
	Curb Heater 457	Radiator	2½ kW	Two 1¼ kW bar	—	£7 13 6	£1 15 11
	Curb Heater 98D	Radiator	2½ kW	Two 1¼ kW bar	—	£9 0 0	£2 2 2
	Curb Heater 98E	Radiator	2 kW	Two 1 kW bar	—	£9 0 0	£2 2 2
	Curb Heater 98E	Radiator	2⅜ kW	Two 1⅛ kW bar	—	£11 15 0	£2 15 0
	" Mistoberry " 417 (Single lighting)	Illuminated radiator	2 kW	Two 1 kW rod	Polished (rustless)	£18 19 6	£4 3 3
	" Mistoberry " 417 (Double lighting)	Illuminated radiator	2 kW	Two 1 kW rod	Polished (rustless)	£21 15 0	£4 15 5
	" Charmberry " 454	Imitation fuel	2 kW	Two 1 kW rod	Silver rose or warm silver	£10 10 0	£2 6 1
	" Charmberry " 550	Imitation fuel	3 kW	Three 1 kW rod	Silver rose or warm silver	£11 10 0	£2 10 5
	" Wellberry " 470	Imitation fuel	2 kW	Two 1 kW bar	Hammered finish	£9 14 7	£2 2 8
	" Auraberry " 447	Imitation fuel	2 kW	" Paravec " special	Silver rose or warm silver	£13 18 0	£3 1 0
	" Studio " 633	Portable radiator	2 kW	Two 1 kW rod	Silver rose with cherry legs and handle	£4 10 0	£0 19 9
BULPITT & SONS, LTD., St. George's Works, Ickneild Street, Birmingham, 18.	" Waldorf " 821 and 822	Portable reflector	1 kW (821) and 2 kW (822)	One or two 1 kW rod	Red, grey, green and beige stoved enamel	£2 1 8 (821) £3 5 0 (822)	£0 9 2 (821) £0 14 3 (822)
	" Woodstock " 831 and 832	Portable reflector	1 kW (831) and 2 kW (832)	One or two 1 kW rod	Gold or silver stoved enamel, black base	£3 19 11 (831) £6 2 6 (832)	£0 17 7 (831) £1 6 11 (832)
	" Cromwell " 795	Portable reflector	2 kW	Two 1 kW rod	Armour bright or brass hammered	£9 4 11	£2 0 7

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
CARRON COMPANY, Carron, Falkirk.	"Sirius"	Portable firebar	1 or 2 kW	One or two 1 kW bar	Vitreous enamel	£2 2 6 (1 kW) £3 7 6 (2 kW)	£0 9 4 (1 kW) £0 14 10 (2 kW)
	"Curtsey"	Portable reflector	1 or 2 kW	One or two 1 kW rod	"Carrontine"	£2 2 6 (1 kW) £3 1 6 (2 kW)	£0 9 4 (1 kW) £0 13 6 (2 kW)
	Pedestal	Portable reflector	1 or 2 kW	One or two 1 kW rod	Art silver	£2 19 0 (1 kW) £3 19 6 (2 kW)	£0 13 0 (1 kW) £0 17 5 (2 kW)
	"Sunglo"	Portable reflector	2½ kW	Two 1¼ kW rod	Chromium	£8 12 0	£1 17 9
	"Precentor"	Portable reflector	1 or 2 kW	Two 1 kW rod	"Carrontine," cream and gold	£3 16 0 (1 kW) £4 17 0 (2 kW)	£0 16 8 (1 kW) £1 1 4 (2 kW)
	"Firebird"	Portable firebar	1 kW	One 1 kW spiral	"Carrontine," various finishes	£2 15 0	£0 12 1
E. K. COLE, LTD., 5, Vigo Street, London, W.1.	"Victor 10" PF1	Portable reflector	1 kW	One 1 kW rod	Cream enamel, chromium or solium reflector	£2 17 6	£0 12 8
	"Victor 20" PF2	Portable reflector	1 or 2 kW	One or two 1 kW rod	Cream enamel, chromium or solium reflector	£3 13 0	£0 16 0
	"Victor 25" PF25	Portable reflector	1¼ or 2½ kW	One or two 1¼ kW rod	Cream enamel, chromium reflector	£5 5 0	£1 3 1
	"Minora 20" WF2	Low level wall mounting reflector	1 or 2 kW	One or two 1 kW rod	Bronze enamel, chromium or solium reflector	£4 16 3	£1 1 2
	"Flamera" DF2	Reflector, imitation coal	1 or 2 kW	One or two 1 kW rod	Bronze enamel with solium reflector or silver enamel with chromium reflector	£11 9 3	£2 10 4
	"Firestreak" FS75	Wall mounting	750 W	Infra-red spiral in silica tube	Chromium reflector, coloured end caps	£3 13 0	£0 16 0
CO-OPERATIVE WHOLESALE SOCIETY, LTD., National Works, Hall Street, Dudley.	"Windsor"	Portable reflector	1 or 2 kW	One or two 1 kW rod	Honeydew or copper lustre	£3 0 0 (1 kW) £5 4 3 (2 kW)	£0 13 2 (1 kW) £1 2 11 (2 kW)
	"Eden"	Portable firebar	1 or 2 kW	One or two 1 kW bar	Grey or oyster green	£1 18 0 (1 kW) £2 18 0 (2 kW)	£0 8 4 (1 kW) £0 12 9 (2 kW)
	"Avon"	Portable firebar	1 or 2 kW	One or two 1 kW bar	Grey or oyster green	£1 7 3 (1 kW) £2 4 3 (2 kW)	£0 6 0 (1 kW) £0 9 9 (2 kW)



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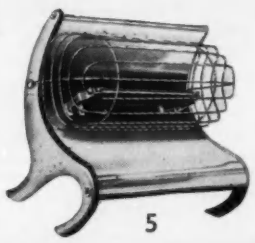

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4. *Bulpitt "Woodstock" model 831*
5. *Carron "Curtsey"*
6. *E. K. Cole "Victor 25"*
7. *Bulpitt "Cromwell"*
8. *Berry's "Studio" reflector fire*
9. *C.W.S. "Windsor"*
10. *Carron "Firebird"*

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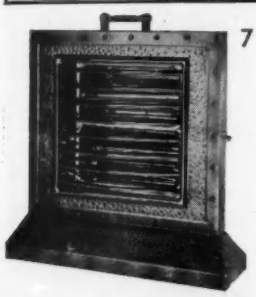

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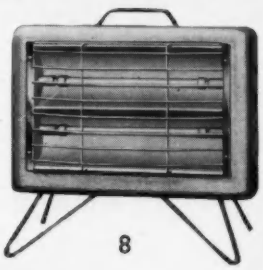

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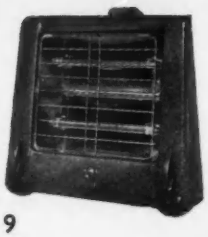

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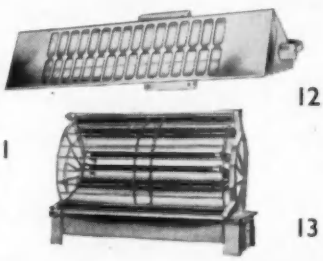
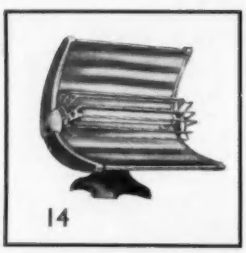
Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
CO-OPERATIVE WHOLESALE SOCIETY, LTD., National Works, Hall Street, Dudley. *(continued)*	" Derwent "	Portable or wall mounting reflector	1 kW	One 1 kW rod	Grey or oyster green	£2 3 9	£0 9 7
	Bowl	Portable reflector	600 W	One 600 W spiral	Chromium, cast base	£1 16 3	£0 8 0
CRANMER & CHESHIRE, LTD., Steward Street, Spring Hill, Birmingham, 18.	" Nichro " 422	Portable tilting reflector	1 or 2 kW	One or two 1 kW rod	Silver grey	£3 8 4 (1 kW) £4 4 6 (2 kW)	£0 15 1 (1 kW) £0 18 7 (2 kW)
	" Nichro " 424	Portable double tilting reflector	2 kW	Two 1 kW rod	Silver grey	£5 15 6	£1 5 5
	" Nichro " 426	Wall fixing (bathroom)	1 kW	One 1 kW rod	Silver grey	£3 9 10	£0 15 5
	" Nichro " 429	Wall fixing (bathroom)	¾ kW	One ¾ kW rod	Silver grey	£3 6 2	£0 14 7
	" Nichro " 430	Portable tilting reflector	¾ or 1½ kW	One or two ¾ kW rod	Silver grey	£3 2 6 (¾ kW) £3 17 2 (1½ kW)	£0 13 9 (¾ kW) £0 17 0 (1½ kW)
	" Nichro " 438	Portable tilting reflector with glow lamp behind grille	2 kW	Two 1 kW rod	Silver grey	£6 0 9	£1 6 7
	" Nichro " 451	Wall fixing	1 kW	One 1 kW rod	Cream enamelled	£3 9 10	£0 15 5
	" Nichro " 452	Wall fixing	¾ kW	One ¾ kW rod	Cream enamelled	£3 6 2	£0 14 7
	" Nichro " 448	Wall fixing	¾ or 1 kW	One ¾ or 1 kW rod	Cream and gold	£2 19 0	£0 13 0
CROSSLANDS (RUGELEY), LTD., 55, Ebury Street, London, S.W.1.	" Raydant " 800/1 and 800/2	Portable reflector	1 or 2 kW	One or two 1 kW rod	Cream, red, silver or green	£2 7 6 (800/1) £3 4 2 (800/2)	£0 10 4 (800/1) £0 13 11 (800/2)
	" Raybar " 700/1 and 700/2	Portable firebar	1 or 2 kW	One or two 1 kW bar	Red, pale green or silver	£1 10 0 (700/1) £2 7 6 (700/2)	£0 6 6 (700/1) £0 10 4 (700/2)
A. D. DAVIDSON ELECTRIC CO., 62, Granville Street, Birmingham, 1.	" Davey " F.220 and F.221	Portable reflector	1 or 2 kW	One or two 1 kW rod	Chromium on brass	£2 11 6 (F.220) £3 16 0 (F.221)	£0 11 4 (F.220) £0 16 8 (F.221)
	" Diamond " F.230 and F.231	Portable reflector	1 or 2 kW	One or two 1 kW rod	Stone or pastel green	£2 17 6 (F.230) £3 5 6 (F.231)	£0 12 7 (F.230) £0 14 4 (F.231)
	" Davey " Bowl	Portable reflector	600 W	One 600 W spiral	Chromium on copper	£1 7 6	£0 6 1
DEXRAY ENGINEERING CO., LTD., 34, Ardwick Green South, Manchester, 13.	R.10	Portable or inset	2 kW	Two 1 kW rod	Cream or cream/gold	£6 5 0	£1 8 0
	R.15	Wall mounting	1 kW	One 1 kW rod	Cream and black	£3 10 0	£0 15 9
	R.33	Wall mounting (inset)	2 kW	Two 1 kW rod	Anodised bright gold panel, anodised copper reflectors	£34 10 0	£1 2 6 (on fire section only)



11. *A. D. Davidson " Diamond "*
12. *Cranmer & Cheshire model 448 wall fire*
13. *Crossland " Raydant "*
14. *Electroway Heaters model 410*



Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
DIMPLEX, LTD., Millbrook, Southampton.	IRD.750	Wall mounting	750 W	One 750 W infra-red spiral	Stove enamelled, various colours	£4 15 0	£1 0 9
	IR12, VH2 and VH3	Inset, vertical reflector	1, 2 and 3 kW	One, two and three 1 kW rod	Chromium	£2 16 6 (IR12) £4 3 0 (VH2) £6 2 0 (VH3)	£0 12 5 (IR12) £0 18 3 (VH2) £1 6 10 (VH3)
	IA2	Inset, parabolic reflector	2 kW	Two 1 kW rod	Chromium	£7 5 0	£1 11 10
	IH1R, IH2R and IH3R	Inset, horizontal reflector	1, 2 and 3 kW	One, two and three 1 kW rod	Chromium	£3 8 6 (IH1R) £4 14 6 (IH2R) £7 13 6 (IH3R)	£0 15 1 (IH1R) £1 0 10 (IH2R) £1 13 9 (IH3R)
	IH1, IH2 and IH3	Inset, panel bar	1, 2 and 3 kW	One, two and three 1 kW bar	Chromium	£3 1 0 (IH1) £4 2 0 (IH2) £6 11 6 (IH3)	£0 13 4 (IH1) £0 18 0 (IH2) £1 9 0 (IH3)
	IE1R, IE2R and IE3R	Inset, horizontal reflector	1, 2 and 3 kW	One, two and three 1 kW rod	Stoved enamel	£2 9 0 (IE1R) £3 11 6 (IE2R) £5 18 0 (IE3R)	£0 10 9 (IE1R) £0 15 9 (IE2R) £1 6 0 (IE3R)
	IG1R and IG2R	Wall, horizontal reflector	1 and 2 kW	One or two 1 kW rod	Stoved enamel	£3 1 0 (IG1R) £4 6 0 (IG2R)	£0 13 5 (IG1R) £0 18 11 (IG2R)
ELECTROWAY HEATERS, LTD., Rosebery Street, Loughborough, Leics.	IG1 and IG2	Wall, panel bar	1 and 2 kW	One or two 1 kW bar	Stoved enamel	£2 16 0 (IG1) £3 11 0 (IG2)	£0 12 4 (IG1) £0 15 7 (IG2)
	WIR12 and WVH2	Wall, vertical reflector	1 and 2 kW	One or two 1 kW rod	Chromium, stoved enamel plaque	£4 7 0 (WIR12) £5 13 6 (WVH2)	£0 19 2 (WIR12) £1 5 0 (WVH2)
	WH2	Wall, panel bar	2 kW	Two 1 kW bar	Chromium, stoved enamel plaque	£5 12 6	£1 4 9
	WH2R	Wall, horizontal reflector	2 kW	Two 1 kW rod	Chromium, stoved enamel plaque	£6 6 0	£1 7 9
	WE2	Wall, panel bar	2 kW	Two 1 kW bar	Stoved enamel fire and plaque	£4 14 6	£1 0 10
	WE2R	Wall, horizontal reflector	2 kW	Two 1 kW rod	Stoved enamel fire and plaque	£5 3 0	£1 2 8
	R12	Wall, bathroom or portable	1 kW	One 1 kW rod	Hammered silver stoved enamel	£3 1 0	£0 13 5
	710 and 720	Portable, panel bar	1 and 2 kW	One or two 1 kW bar	Stoved enamel	£1 16 0 (710) £2 17 0 (720)	£0 7 11 (710) £0 12 7 (720)
	71 and 72	Portable, horizontal reflector	1 and 2 kW	One or two 1 kW rod	Stoved enamel	£2 4 0 (71) £3 10 6 (72)	£0 9 8 (71) £0 15 6 (72)
	410 and 410/2	Portable reflector	1 and 2 kW	One or two 1 kW rod	Hammered silver	£3 13 6 (410) £4 14 6 (410/2)	£0 16 2 (410) £1 0 10 (410/2)
ENGLEHARD INDUSTRIES, LTD., Hanovia Lamps Division, Bath Road, Slough, Bucks.	"Radisil"	Wall mounting	350, 525 or 725 W	One 350, 525 or 725 W infra-red spiral	Cream stove enamelled, gold guard	£4 10 0	£1 0 3
	"Radisil"	Wall mounting	1½ kW	One 1½ kW infra-red spiral	Cream stove enamelled, gold guard	£8 5 0	£1 17 2
FALK, STADELMANN & CO., LTD., 91, Farringdon Road, London, E.C.1.	"Serenity"	Portable reflector, illuminated screen	2 kW	Two 1 kW rod	Polychromatic gold	£10 8 6	£2 5 9
	"Felicity"	Portable reflector, illuminated screen	2 kW	Two 1 kW rod	Polychromatic gold	£6 19 5	£1 10 7

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
FALK, STADELMANN & CO., LTD., 91, Farringdon Road, London, E.C.1. (continued)	" Gaiety "	Portable reflector, illuminated	2 kW	Two 1 kW rod	Gold	£5 10 0	£1 4 2
	" Festivity "	Reflector, illuminated	2 kW	Two 1 kW rod	Gold	£9 0 0	£1 19 6
	" Festivity "	Wall mounting panel fire	2 kW	Two 1 kW rod	Gold	£7 5 0	£1 11 10
	" Bathroom "	Wall mounting reflector	1 kW	One 1 kW rod	Cream	£3 2 6	£0 13 9
	" Eclipse "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Grey	£1 14 9 (1 kW) £2 12 6 (2 kW)	£0 7 8 (1 kW) £0 11 6 (2 kW)
	" Comet "	Portable reflector	750 W, 1 kW or 2 kW	One 750 W or one or two 1 kW rod	Off-white and black, cardinal red and black	£1 18 7 (750 W) £1 19 11 (1 kW) £2 19 0 (2 kW)	£0 8 5 (750 W) £0 8 9 (1 kW) £0 13 0 (2 kW)
	" Meteor "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Off-white and black, cardinal red/cream, mocha/cream, Gun-metal/cloud grey	£3 2 7 (1 kW) £3 16 5 (2 kW)	£0 13 9 (1 kW) £0 16 9 (2 kW)
	U.95664	Portable 10in bowl reflector	600 W spiral	One 600 W spiral	Grey or cream	£1 6 0	£0 5 9
	U.95756 " Supersil "	Wall mounting infra-red reflector	750 W	One 750 W silica tube encased spiral	Cream or cardinal red, complete with double pole on/off cord switch	£4 10 0	£0 19 9
FALKIRK IRON CO., LTD., 28, Brook Street, London, W.1.	39	Portable reflector	1 kW	One 1 kW rod	Stove enamelled, various colours	£2 4 6	£0 9 9
	41	Portable reflector	2 kW	Two 1 kW rod	Stove enamelled, various colours	£3 2 6	£0 13 9
	" Firefly " 43	Portable reflector	1 kW	One 1 kW rod	Stove enamelled, various colours	£2 4 6	£0 9 9
	" Belford "	Inset, wall mounting	1 or 2 kW	One or two 1 kW rod	Copper " Alisheen " front and sides, chromium reflector	£4 15 0 (1 kW) £5 5 0 (2 kW)	£1 0 10 (1 kW) £1 3 0 (2 kW)
FERRANTI, LTD., Hollinwood, Lancs.	P.3310	Panel reflector, ventilating grille	2½ kW	Two 1¼ kW rod	Chromium reflector, frame and decorative screen	£25 15 0 £3 5 0 (decorative screen)	£5 13 0
	P.33132	Panel reflector	2 kW	Two 1 kW rod	Chromium reflector, frame and guard	£16 18 8	£3 14 4
	P.33122	Panel reflector	1½ kW	Two ¾ kW rod	Chromium reflector, frame and guard	£13 2 6	£2 17 7
FORMO PRODUCTS, LTD., 153, Masons Hill, Bromley, Kent.	" Sunnyheat " " Savoy "	Portable reflector	750 W	One 750 W rod	Ivory stove enamelled	£2 1 6	£0 9 0
	" Sunnyheat " " Carlton "	Portable reflector	1 kW	One 1 kW rod	Ivory stove enamelled	£2 5 0	£0 9 9
	" Sunnyheat " " Connaught "	Portable reflector	1½ kW	Two ¾ kW rod	Ivory stove enamelled	£2 12 6	£0 11 4½
	" Sunnyheat " " Dolphin "	Wall mounting (bathroom)	600 W	One 600 W infra-red rod	Ivory stove enamelled	£3 2 6	£0 13 6½
	" Sunnyheat " " Dolphin "	Wall mounting (bathroom)	750 W	One 750 W rod	Ivory stove enamelled	£2 12 6	£0 11 4½
	" Sunnyheat " " Grosvenor "	Wall mounting	750 W	One 750 W rod	Ivory stove enamelled	£2 7 6	£0 10 3½
GATEHILL MFG. CO., LTD., Kennard Road, Stratford, E.15.	" Sussex "	Portable reflector	1 kW	One 1 kW rod	Silver hammered or red	£1 3 0	£0 5 0
	" Stratford "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Red and grey	£1 6 6 (1 kW) £1 18 0 (2 kW)	£0 5 9 (1 kW) £0 8 2 (2 kW)

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
GATEHILL MFG. CO., LTD., Kennard Road, Stratford, E.15. *(continued)*	"Richmond"	Portable reflector	1 or 2 kW	One or two 1 kW rod	Gold and mushroom	£1 9 5 (1 kW) £2 4 11 (2 kW)	£0 6 4 (1 kW) £0 9 9 (2 kW)
	10in Bowl	Portable bowl	600/750 W	600 or 750 W spiral	Contemporary	£0 18 6	£0 3 3
	"Becosil"	Wall mounting	725 W	One 725 W infra-red spiral	Contemporary	£4 10 0	£1 0 3
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2	D.2342G	Portable firebar	2 kW	Two 1 kW bar	Beige or green vitreous enamel	£3 17 1	£0 16 11
	D.2496G and D.2497G	Portable firebar	1 or 2 kW	One or two 1 kW bar	Bronze, cream or green	£1 17 9 (D.2496G) £2 15 9 (D.2497G)	£0 8 3 (D.2496G) £0 12 3 (D.2497G)
	D.2757	Pedestal bowl	750 W	One 750 W spiral	Cream	£1 18 7	£0 8 5
	D.2766 and D.2767	Portable or wall mounting reflector	1 or 2 kW	One or two 1 kW rod	Cream	£3 5 7 (D.2766) £4 4 1 (D.2767)	£0 14 5 (D.2766) £0 18 5 (D.2767)
	D.2768	High level, wall mounting	1 kW	One 1 kW rod	Cream	£2 15 4	£0 12 2
	"Cosyglo" D.2813	Portable reflector	2 kW	Two 1 kW rod	Green	£5 16 5	£1 5 7
	"Cosyglo" D.2814	Screen reflector	2 kW	Two 1 kW rod	Hammered bronze	£11 11 8	£2 10 10
	D.2773 and D.2774	Portable reflector	1 or 2 kW	One or two 1 kW rod	Cream or silver bronze	£2 15 4 (D.2773) £3 13 0 (D.2774)	£0 12 2 (D.2773) £0 16 0 (D.2774)
	D.2775	Portable reflector	2 kW	Two 1 kW rod	Moonstone grey and burgundy with black legs	£4 16 9	£1 1 3
	"Cosyglo" D.2853	Wall mounting	2 kW	Two 1 kW rod	Cream or hammered bronze	£6 9 2	£1 8 4
	"Cosyglo" D.2818	Portable reflector	2 kW	Two 1 kW rod	Burgundy and gold	£4 16 4	£1 1 2
	D.2776	Portable reflector	1 kW	One 1 kW rod	Moonstone grey and burgundy with black legs	£2 19 5	£0 13 1

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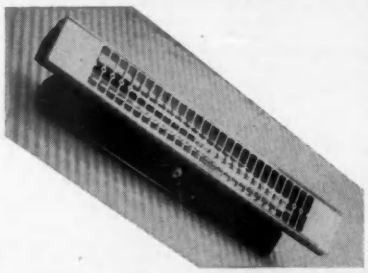

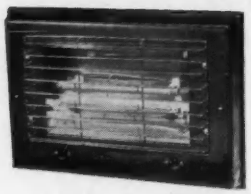

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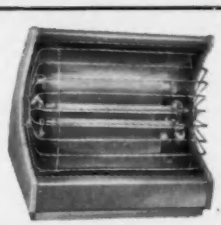

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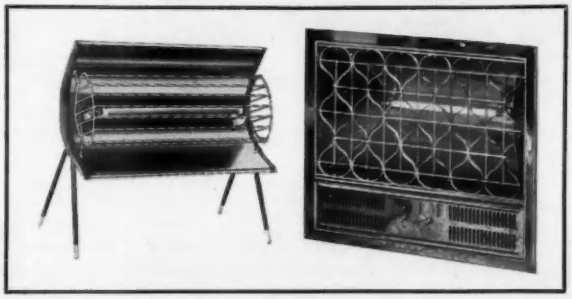


15. *Falk, Stadelmann "Supersil" wall mounting heater*

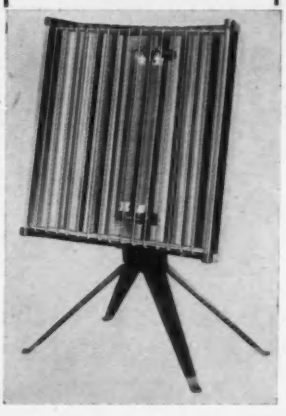
16. *Falkirk Iron Co.'s "Belford" semi-inset wall fire*

17. *Falk, Stadelmann "Meteor"*

18. *G.E.C. model D.2776*

19. *Ferranti model P.3310 panel fire*

20. *G.E.C. "Cosyglo" model D.2818*



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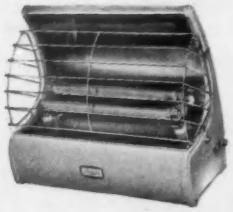
Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
GRAFTON HEATER CO., LTD., 13-15, Westland Place, London, N.1.	1056	Portable reflector, coal effect	750 W	One 750 W rod	Various colours	£2 16 0	£0 12 8
	1060	Bowl	600 W	One 600 W E.S.	Various colours	£1 1 0	£0 4 9
	1055	Portable reflector	750 W	One 750 W rod	Various colours	£1 3 6	£0 5 3
	1055/2	Portable reflector	1½ kW	Two 750 W rod	Various colours	£1 19 6	£0 8 11
GRIMWOOD (CROYDON), LTD., 59-65, Cross Road, Croydon.	" Infrasol "	Wall mounting	750 W	One 750 W infra-red spiral	Stove enamelled and anodised	£4 0 0	£0 17 4
L. G. HAWKINS & CO., LTD., 38-35, Drury Lane, London, W.C.2.	" Boomerang " LGH.339 and LGH.340	Portable reflector	1 or 2 kW	One or two 1 kW rod	Bronze, mushroom and cream	£2 19 0 (339) £3 12 11 (340)	£0 12 11 (339) £0 16 0 (340)
	" Three-way " LGH.336	Portable reflector	1 kW	One 1 kW rod	Bronze, mushroom and cream	£1 12 6	£0 7 2
	" Pixie " LGH.331	Portable reflector	1 kW	One 1 kW rod	Mushroom, silver or cream	£1 18 7	£0 8 6
	" Marilyn " LGH.334	Portable reflector	1 kW	One 1 kW rod	Ivory, silver or mushroom	£2 3 11	£0 9 8
	" Loughton " LGH.337 and LGH.338	Pedestal reflector	1 or 2 kW	One or two 1 kW rod	Maroon and dove grey and all-cream	£3 9 0 (337) £4 2 9 (338)	£0 15 2 (337) £0 18 2 (338)
HEATRAE, LTD., Heatrae Works, Norwich.	" Saferod "	Reflector, wall mounting	1 kW	One 1 kW rod	Mushroom and chromium	£4 9 6	£0 19 8
	" Piloc "	Portable reflector	1 kW	One 1 kW rod	Ivory tan	£4 9 6	£0 19 8
	" Dandy "	Portable reflector	2 kW	Two 1 kW rod	Ivory tan	£8 2 0	£1 15 7
	" Majestic "	Reflector, floor mounting	2 kW	Two 1 kW rod	Cameo fawn and pebble grey	£12 12 0	£2 15 3
HOTPOINT ELECTRIC APPLIANCE CO., LTD., Crown House, Aldwych, London, W.C.2.	" Hystan " 5550/1/2	Portable reflector	2 kW	Two 1 kW rod	Cream, yellow and black, red and yellow	£5 3 4	£1 2 8
	" Parabain " 5321	Wall mounting reflector	1 kW	One 1 kW rod	Cream	£3 16 10	£0 16 11
	" Paraglow " 5380/1 and 5390/1	Portable reflector	1 or 2 kW	One or two 1 kW rod	Cream or bronze	£2 8 4 (5380/1) £3 2 3 (5390/1)	£0 10 8 (5380/1) £0 13 9 (5390/1)
	" Jewel " 5510/1	Portable reflector	1 kW	One 1 kW rod	Cream or red	£2 1 9	£0 9 3
	" Parabeau " 5472	Portable reflector	2 kW	Two 1 kW rod	Gilt	£6 8 7	£1 8 3
	" Guardian " 5401, 5402 and 5403	Portable reflector	2 kW	Two 1 kW rod	Gold (5401) Pink (5402) Blue (5403)	£6 0 0	£1 6 4
	" Carlton " 5141, 5142 and 5143	Reflector imitation coal effect	2 kW	Two 1 kW rod	Silver (5141) Copper (5142) Gold (5143)	£12 0 0	£2 12 8
	" Screen Heater " 5420	Radiant heater	1 kW	One 1 kW fused on glass	White and cream	£12 18 3	£2 16 9
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex.	" Angular " 3007	Wall mounting reflector	1 kW	One 1 kW rod	Cream	£2 12 6	£0 11 7
	" Albemarle " 3008	Portable, imitation coal effect	2 kW	Two 1 kW rod	Gold, flecked cream	£7 0 2	£1 10 11
	" Vertic " 3005 and 3006	Portable reflector	1 or 2 kW	One or two 1 kW rod	Pastel cream and grey copper	£1 12 7 (3005) £2 12 6 (3006)	£0 7 3 (3005) £0 11 7 (3006)



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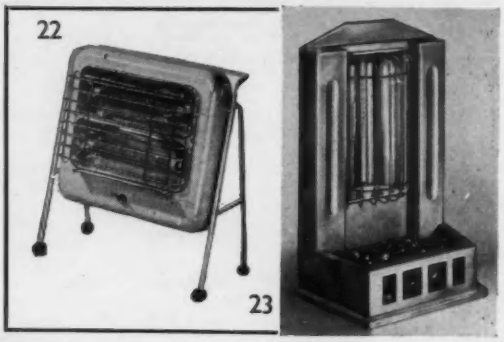
21. *Jackson model 732J*
22. *Hotpoint "Hystan"*
23. *Grafton 750 W coal effect model*
24. *L. G. Hawkins "Loughton"*
25. *Heatrae "Saferod"*



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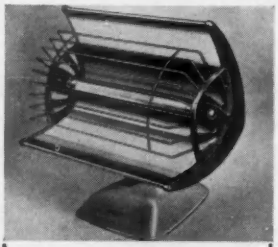

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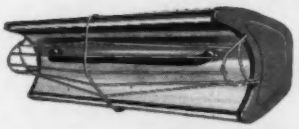

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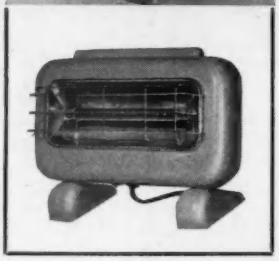

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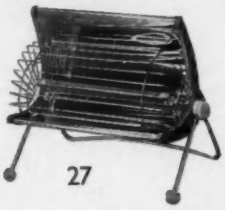
26. *Hotpoint "Jewel"*
27. *Jackson model 757J*
28. *Heatrae "Majestic"*



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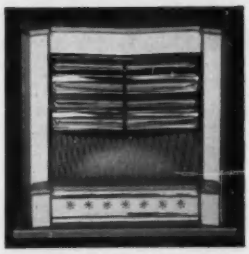

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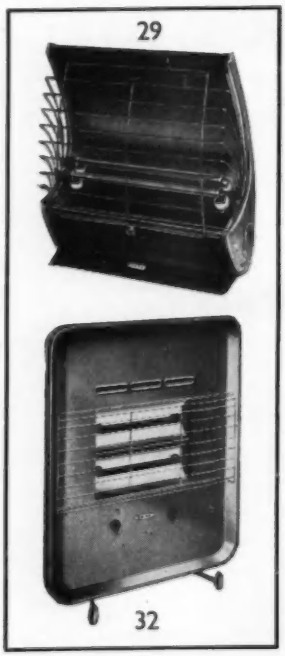
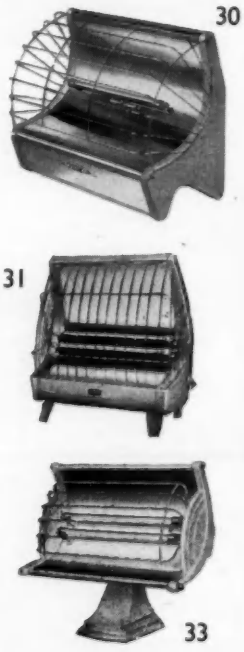
Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex. *(continued)*	"Standard" 3001 and 3002	Portable firebar	1 or 2 kW	One or two 1 kW bar	Copper bronze	£1 12 7 (3001) £2 11 9 (3002)	£0 7 3 (3001) £0 11 5 (3002)
	"Standard" 3003 and 3004	Portable reflector	1 or 2 kW	One or two 1 kW rod	Copper bronze	£2 1 6 (3003) £3 1 5 (3004)	£0 9 2 (3003) £0 13 7 (3004)
JACKSON ELECTRIC STOVE CO., LTD., Dallow Road, Luton, Beds.	251J	Inset reflector	2 kW	Two 1 kW rod	Chromium	£5 0 0	£1 2 0
	252J	Panel reflector	2 kW	Two 1 kW rod	Chromium and mushroom panel	£5 15 0	£1 5 3
	253J	Portable reflector	2 kW	Two 1 kW rod	Chromium	£4 17 6	£1 1 5
	731J and 732J	Portable reflector	1 or 2 kW	One or two 1 kW rod	Willow green, citron yellow, Dresden blue	£2 17 6 (731J) £3 12 6 (732J)	£0 12 8 (731J) £0 15 11 (732J)
	756J and 757J	Adjustable, portable	1 or 2 kW	One or two 1 kW rod	Various "House and Garden" colours	£3 15 0 (756J) £5 0 0 (757J)	£0 16 6 (756J) £1 2 0 (757J)
	758J	Adjustable, wall mounting	1 kW	One 1 kW rod	Black and cream	£3 17 6	£0 17 0
MARSDEN & BATESON, LTD., 67-69, Scholefield Street, Nechells, Birmingham, 7.	"Marbat" 1 and 2	Inset firebar	1 or 2 kW	One or two 1 kW bar	Hammered bronze or silver	£2 2 0 (1) £3 6 8 (2)	£0 9 3 (1) £0 14 8 (2)
	"Marbat" 3 and 4	Wall panel, firebar	1 or 2 kW	One or two 1 kW bar	Hammered bronze or silver	£2 13 9 (3) £4 0 10 (4)	£0 11 0 (3) £0 17 9 (4)
	"Marbat" bowl	Portable or wall mounting	600 W	One 600 W spiral	Copper (*a*) or aluminium (*b*)	£2 5 0 (*a*) £1 18 6 (*b*)	£0 10 0 (*a*) £0 8 6 (*b*)

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
METWAY ELECTRICAL INDUSTRIES, LTD., Canning Street, Kemp Town, Brighton, 7.	" Minorway "	Small portable reflector	750 W	One 750 W rod	Mottled silver	£0 19 9	£0 4 3
	" Magnaway "	Portable reflector	2 kW	Two 1 kW rod	Mottled silver and chromium	£2 10 0	£0 10 10
	" Mirrorway "	Portable bowl	750 W	One 750 W spiral	Plain aluminium	£1 1 9	£0 4 9
	" Marvelway "	Portable bowl	1 kW	One 1 kW spiral	Fluted aluminium	£1 13 3	£0 7 2
	" Superway "	Portable bowl	600 W	One 600 W spiral	Plain aluminium	£0 18 6	£0 3 3
MIDLAND ELECTRIC MFG. CO., LTD., M.E.M. Works, Reddings Lane, Birmingham, 11.	" Memray "	Wall mounting	1 kW	One 1 kW rod	Bronze or cream	£2 5 0	£0 9 10
	" Memray "	Portable, swivelled reflector	1 or 2 kW	One or two 1 kW rod	Bronze or cream	£2 15 0 (1 kW) £4 6 0 (2 kW)	£0 12 1 (1 kW) £0 18 10 (2 kW)
	" Reflex "	Portable, fixed reflector	1 or 2 kW	One or two 1 kW rod	Mushroom or mottled stone	£2 5 0 (1 kW) £3 6 0 (2 kW)	£0 9 10 (1 kW) £0 14 6 (2 kW)
	" Memglo "	Portable flat bar	1 or 2 kW	One or two 1 kW bar	Mottled stone	£1 16 4 (1 kW) £2 11 8 (2 kW)	£0 8 0 (1 kW) £0 11 4 (2 kW)
T. B. MORLEY & CO., LTD., Jameson Street, Hull.	" Don "	Portable reflector	750 W to 2 kW	One or two 750 W or 1 kW rod	Cream	£2 11 0 (750 W) £2 14 0 (1 kW) £3 3 0 (1½ kW) £3 9 0 (2 kW)	£0 11 3 (750 W) £0 11 11 (1 kW) £0 13 11 (1½ kW) £0 15 3 (2 kW)
	" Humber "	Portable reflector	750 W or 1,500 W	One or two 750 W rod	Cream	£2 12 0 (750 W) £3 3 0 (1½ kW)	£0 11 6 (750 W) £0 13 11 (1½ kW)
	" Derwent "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Cream	£2 13 0 (1 kW) £3 8 0 (2 kW)	£0 11 8 (1 kW) £0 15 0 (2 kW)





29. *Simplex "Creda Cubana" model CH.352*

30. *Nico "Reflecta-Ray" 1 kW fire*

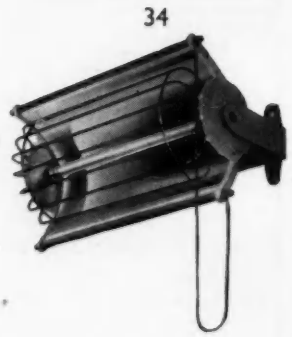
31. *Morphy-Richards FA/20 "Avon"*

32. *Revo "Wessex" screen fire*

33. *T. B. Morley & Co.'s "Humber"*

34. *M.E.M. "Memray" wall mounting fire*

35. *T. B. Morley & Co.'s "Don"*



Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
T. B. MORLEY & CO., LTD., Jameson Street, Hull. *(continued)*	" Thames "	Portable twin reflector	750 W or 1,500 W	One or two 750 W rod	Bronze	£1 14 6 (750 W) £2 12 6 (1½ kW)	£0 7 7 (750 W) £0 11 7 (1½ kW)
	" Severn "	Portable firebar	1 or 2 kW	One or two 1 kW bar	Bronze	£1 13 0 (1 kW) £2 10 0 (2 kW)	£0 7 3 (1 kW) £0 11 0 (2 kW)
	" Aire "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Cream	£2 12 0 (1 kW) £3 7 0 (2 kW)	£0 11 6 (1 kW) £0 14 9 (2 kW)
	" Morco " bowl	Portable reflector	600 W	One 600 W spiral	Cream	£1 8 6	£0 6 3
MORPHY-RICHARDS, LTD., 6, Conduit Street, London, W.1.	" Avon " FA/10 and FA/20	Portable reflector	1 kW (FA/10) and 2 kW (FA/20)	One or two 1 kW rod	Warm bronze	£3 10 0 (FA/10) £4 5 0 (FA/20)	£0 15 2 (FA/10) £0 18 5 (FA/20)
	" Cray " FC/750 and FC/15	Portable reflector	750 W (FC/750) and 1½ kW (FC/15)	One or two 750 W rod	Warm bronze	£2 2 0 (FC/750) £2 12 6 (FC/15)	£0 9 1 (FC/750) £0 11 5 (FC/15)
	" Cray " FC/10 and FC/20	Portable reflector	1 kW (FC/10) and 2 kW (FC/20)	One or two 1 kW rod	Warm bronze	£2 6 6 (FC/10) £2 17 6 (FC/20)	£0 10 1 (FC/10) £0 12 6 (FC/20)
NICO LIGHT ENGINEERING CO., LTD., 1, Laud Street, Croydon.	" Reflecta-Ray "	Portable bowl	600 W	One 600 W spiral	Polished copper (a) or aluminium (b) ivory, red, yellow or grey base	£1 5 0 (a) £1 0 0 (b)	£0 5 10 (a) £0 4 6 (b)
	" Reflecta-Ray "	Portable reflector	¾ or 1 kW	One ¾ or 1 kW rod	Ivory, red, yellow or grey, nickel reflector	£1 7 6	£0 6 0
PIFCO, LTD., Watling Street, Manchester, 4.	" Sheridan " 491	Portable reflector	1 kW	One 1 kW rod	Hammered silver grey or gold	£1 18 7	£0 8 5
T. PRICE & SON (STAMPERS), LTD., Spring Hill Passage, Spring Hill, Birmingham, 18.	" Prilect " 2107A	Imitation coal	1 kW	One 1 kW rod (vertical)	Bronze	£2 0 0	£0 8 9
	" Prilect " 2121	Imitation coal	2 kW	Two 1 kW rod	Bronze	£6 5 0	£1 7 5
	" Prilect " 1509	Imitation coal	2 kW	Two 1 kW rod	Bronze	£4 0 0	£0 17 7
	" Prilect " 2127	Portable reflector	2 kW	Two 1 kW rod	Chromium reflector	£2 10 0	£0 11 0
	" Prilect " 2133	Portable reflector	750 W	One 750 W rod	Nickel plated reflector	£1 3 0	£0 5 1
REELEK APPLIANCES, LTD., Reelek Works, Baldock, Herts.	" Popular "	Portable reflector	¾ or 1 kW and 1½ or 2 kW	One or two ¾ or 1 kW rod	Mushroom	£1 0 0 (¾ or 1 kW) £1 15 0 (1½ or 2 kW)	£0 4 4 (¾ or 1 kW) £0 7 7 (1½ or 2 kW)
	" Minor "	Portable reflector	1 kW	One 1 kW rod	Mushroom	£1 12 0	£0 6 11
	" Viceroy "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Mushroom	£2 15 0 (1 kW) £3 8 10 (2 kW)	£0 11 11 (1 kW) £0 14 11 (2 kW)
	" Wizard "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Mushroom	£2 0 0 (1 kW) £2 10 0 (2 kW)	£0 8 8 (1 kW) £0 10 10 (2 kW)
	" Adjustable "	Portable reflector	1 or 2 kW	One or two 1 kW rod	Mushroom	£2 5 0 (1 kW) £2 15 0 (2 kW)	£0 9 9 (1 kW) £0 11 11 (2 kW)
REVO ELECTRIC CO., LTD., Tipton, Staffs.	" Reflexam " F.14546 and F.1454B	Wall mounting reflector	1 or 2 kW	One or two 1 kW rod	Artshade silver and chromium	£3 8 6 (F.14546) £4 12 6 (F.1454B)	£0 15 0 (F.14546) £1 0 3 (F.1454B)

Manufacturer	Name or Model	Type	Total Loading	Elements	Finish	Price (excl. Tax)	Purchase Tax
REVO ELECTRIC CO., LTD., Tipton, Staffs. (*continued*)	" Revo-Inset " F.13955 and F.13956	Inset with slabbing frame	1 or 2 kW	One or two 1 kW bar	Grey, stone, red or gold	£2 4 6 (F.13955) £3 3 0 (F.13956)	£0 9 9 (F.13955) £0 13 10 (F.13956)
	" Revo-Inset " F.13957 and F.13958	Inset with slabbing frame	1 or 2 kW	One or two 1 kW rod	Grey, stone, red or gold	£2 7 6 (F.13957) £3 9 0 (F.13958)	£0 10 5 (F.13957) £0 15 1 (F.13958)
	" Revo-Outset " F.14639 and F.14640	Direct wall mounting	1 or 2 kW	One or two 1 kW bar	Grey, stone, red or gold	£2 11 0 (F.14639) £3 11 0 (F.14640)	£0 11 2 (F.14639) £0 15 7 (F.14640)
	" Revo-Outset " F.14549 and F.14550	Direct wall mounting	1 or 2 kW	One or two 1 kW rod	Grey, stone, red or gold	£2 14 0 (F.14549) £3 17 0 (F.14550)	£0 11 10 (F.14549) £0 16 11 (F.14550)
	" Tubula " F.14542 and F.14544	Portable reflector	1 or 2 kW	One or two 1 kW rod	Artshade silver and chromium	£3 5 6 (F.14542) £4 7 0 (F.14544)	£0 14 4 (F.14542) £0 19 1 (F.14544)
	" Somerset "	Portable firebar	1 or 2 kW	One or two 1 kW bar	Grey, green, yellow or red	£2 17 6 (1 kW) £4 3 0 (2 kW)	£0 12 7 (1 kW) £0 18 2 (2 kW)
	" Wessex "	Portable screen	2 kW	Two 1 kW rod	Grey, stone, red or gold	£6 13 0 (small size) £6 16 0 (large size)	£1 9 2 (small size) £1 9 10 (large size)
SIMPLEX ELECTRIC CO., LTD., Creda Works, Blythe Bridge, Staffs.	" Cubana " CH.353	Portable reflector	1 kW	One 1 kW rod	Six two-tone colour schemes	£4 15 0	£1 0 10
	" Cubana " CH.352	Portable reflector	2 kW	Two 1 kW rod	Six two-tone colour schemes	£5 10 6	£1 4 3
TELSEN ELECTRIC CO. (1935), LTD., Fitzgeorge Street, Collyhurst, Manchester, 9.	1200 and 1205	Portable reflector	1 or 2 kW	One or two 1 kW rod	Various colours	£1 13 4 (1200) £2 13 4 (1205)	£0 7 6 (1200) £0 12 0 (1205)
	1210 and 1215	Portable reflector with pedestal	1 or 2 kW	One or two 1 kW rod	Various colours	£1 18 4 (1210) £3 1 4 (1215)	£0 8 7 (1210) £0 13 9 (1215)

Catalogues and Lists

ANTI-VIBRATION EQUIPMENT.—12-page booklet (957) dealing with devices produced by the company for vibration and shock isolation.—**W. Christie & Grey, Ltd.,** 4, Lloyd's Avenue, London, E.C.3.

BUSBAR TRUNKING.—Folder dealing with the company's system of busbar trunking for overhead power distribution with insulated and screened plug-in positions at 2ft centres.—**Davis Sheet Metal Engineering Co., Ltd.,** Eley's Estate, Angel Road, Edmonton, London, N.18.

CARBON PRODUCTS.—Broadsheet entitled " Stepping Out With Progress " reviewing the history and development of the company.—**Morgan Crucible Co., Ltd.,** Battersea Church Road, London, S.W.11.

CATHODE RAY TUBES.—Booklet giving particulars and technical data on instrument cathode ray tubes.—**Mullard, Ltd.,** Mullard House, Torrington Place, London, W.C.1.

COMPUTERS.—Leaflet giving a brief specification of the " Stantec-Zebra " electronic digital computer.—**Standard Telephones & Cables, Ltd.,** Corporation Road, Newport, Mon.

Folder (DP.2) describing Model 25 high-speed reperforator for use with digital computer input and output equipment and for automatic data recording applications.—**Creed & Co., Ltd.,** Telegraph House, Croydon, Surrey.

ELECTRICAL PLANT.—95-page illustrated catalogue with text in French and English giving particulars of the wide range of the company's products, including complete installations in power stations, mines and steelworks, etc., and embracing rotating machinery, pumps, transformers, switchgear, and domestic appliances, etc.—**Ateliers de Constructions Electriques de Charleroi,** Charleroi, Belgium.

FIRST AID REQUISITES.—166-page catalogue (44) listing a full range of first aid requisites for industrial premises, together with a separate price list. A section is included giving details of the regulations concerning first aid in various industries and trades.—**Cuxson, Gerrard & Co., Ltd.,** Fountain Lane, Oldbury, Birmingham.

GENERATING EQUIPMENT.—Booklet (OF.1) entitled " Service to the Oil Industry " and containing particulars and illustrations of a " utility power house " which has been specially designed for oilfields to provide electric power for all the requirements of rig and camp. The booklet also includes details of pumps and gas turbines for the oil industry. —**Auto Diesels, Ltd.,** Uxbridge, Middlesex.

INSTRUMENTS.—Illustrated folder (057) dealing with instruments in the company's range.—**Evershed & Vignoles, Ltd.,** Acton Lane Works, Chiswick, London, W.4.

MAGNETIC CHUCK.—Leaflet illustrating and describing a fine pole permanent magnet chuck for maximum table loading on production grinding machines.—**James Neill & Co. (Sheffield), Ltd.,** Sheffield, 11.

OFFICE MACHINE.—Leaflet containing a description and illustration of the " Comptograph 101" all-electric adding/listing machine. —**Comptometer, Ltd.,** Aldwych House, London, W.C.2.

RELAY COVER.—Transparent plastics cover suitable for P.O. 3000 type relays having a maximum of four pairs of heavy duty changeover contacts, and designed to protect the relay against falling dust particles and iron filings and to provide protection against electric shock.—**Radiovisor Parent, Ltd.,** Stanhope Works, High Path, London, S.W.19.

SPACE HEATING.—Illustrated booklet describing low and high temperature radiant heating systems and a leaflet on the company's off-peak night storage heaters.—**Thermodare (Great Britain),** York Mansion, 94/98, Petty France, London, S.W.1.

SWITCHGEAR.—Five illustrated descriptive brochures dealing with oil filled circuit-breakers, metalclad switchgear, control switches, indicating lamps, and ring type current transformers.—**English Electric Co., Ltd.,** Stafford.

TERMINAL BLOCKS.—Illustrated leaflet dealing with " Kabi " 30 A and 60 A unit terminal blocks.—**Precision Components (Barnet), Ltd.,** 13, Byng Road, Barnet, Herts.

TOOLS.—Folder giving details of five tools for stripping and cutting wires and cables.—**Hellermann, Ltd.,** Crawley, Sussex.

TRANSFORMERS. — Booklet (25 pp.) giving details and consolidated net prices for " Variac " voltage-adjusting transformers, " Bat " mains transformers and decade-condenser boxes and other equipment.—**Claude Lyons, Ltd.,** 4-10, Ware Road, Hoddesdon, Herts.

WIRING ACCESSORIES. — Forty-page illustrated catalogue covering the company's range of wiring accessories.—**Clang, Ltd.,** Cricklewood, London, N.W.2.

Catalogue (52 pp.) illustrating and describing the company's range of wiring accessories, bell pushes, cable markers, etc.—**Fitzgibbon & Murray, Ltd.,** The Lower Mill, Ewell, Surrey.

NEW ELECTRICAL EQUIPMENT

Arc-Welding Safety Devices

A range of low voltage safety devices for use with a.c. arc-welding plant to reduce the relatively high open circuit voltage to a safe value of 30 V has been introduced by QUASI-ARC, LTD., Bilston, Staffs. There are three types for different ratings, the principle of operation being identical.

The device consists of a double-wound transformer, a relay, a contactor and other ancillary apparatus contained in a sheet steel case. The unit is arranged to fail-to-safety. The speed of response when striking an arc is such that even an experienced welder cannot detect the presence of a device. At the same time normal fluctuations of the arc do not cause the unit to operate since the circuit incorporates a preset time delay. Correct operation of the device is indicated by a small low voltage neon lamp which is illuminated when the set is on open circuit at the reduced voltage.

Heating Mantle

One of the smallest electric surface heating units ever to be made, the "MIC/VAR" semi-micromantle, has been introduced by ISOPAD, LTD., Barnet By-Pass, Boreham Wood, Herts., for heating spherical or pear-shaped flasks used in semi-micro preparative and analytical chemistry. Semi-micro chemistry, employing miniaturised glassware, has been used increasingly for teaching and research during the past few years because of the savings in cost, time, power, bench space and materials achieved.

The heater consists of a grey stove-enamelled sheet metal housing in which the heating surface is mounted. This is of standard Isopad-weave glass yarn cloth with interwoven insulated electric resistance wire and is specially shaped to provide secure support for a wide range of flasks. The pliable heating surface results in a high rate of heat transfer. Fitted in the same housing is a variable resistor providing stepless variable temperature control over the entire range up to 270 deg C. A metal rod for supporting top-heavy glass assemblies can be mounted at the rear of the housing.

Meter Innovations

A house service meter with a repeater dial which can be read from the outside, avoiding the need for meter readers to make further calls when premises are unoccupied, has been introduced by FERRANTI, LTD., Hollinwood, Lancs.

A standard Ferranti meter is installed in the usual position inside the premises. The repeater is also fixed inside with only the dial visible from the outside. In instances where there might be objections to making a comparatively large hole through the wall, the repeater can be fixed to the outside wall face, but a small hole is still required for the leads. The repeaters are Post Office message recorders operated by impulses transmitted from contacts fitted to the house service meters.

Another device recently introduced by Ferranti is the billing meter. The consumer inserts a card into the slot provided in the meter and by turning the handle a record of the kWh registered to date is printed on the card. The card is then posted back to the supply authority. Basically, the printing mechanism consists of a spring driven cyclometer with rollers, which have raised digits on the periphery. As the meter kWh register advances it releases the drive from the spring through the medium of a dead centre escapement so that the printing rollers are maintained in step with the reading shown on the meter dials. The spring providing the drive is wound by the printing handle, which carries out the two operations of printing and winding at the same time, thus imposing negligible load on the meter and leaving accuracy unimpaired.

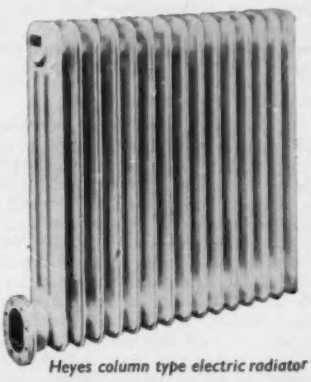
Flameproof Radiators

A range of marine and flameproof oil-filled electric radiators is announced by HEYES & CO., LTD., Water-Heyes Electrical Works, Wigan, Lancs. Two kinds are available. The column type consists of a series of electrically welded steel pressings forming separate hollow columns, which are joined together by common manifolds at top and bottom to form a complete column radiator. The panel type has two steel pressings welded together to form a panel with upper and lower manifolds. Both types can be supplied to almost any length and the radiators are partially filled with a special blend of heat transfer mineral oil having a high boiling point and low pour point, freedom from formation of free acid and sludging, low coefficient of expansion and stability throughout the temperature range.

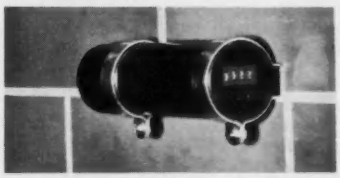
An immersion heater of watertight construction is contained in the bottom manifold, the heating element being of the sheathed wire type; the heater is brazed in position and there are, therefore, no parts to work loose to allow oil leakage. The flameproof unit is certified by the Ministry of Power for Group II. The marine pattern has a watertight connector box.

Direct Switching Starter

A direct switching starter suitable for motors up to 10 h.p. at 500 V is announced by KLOCKNER-MOELLER (ENGLAND), LTD., 7, Charterhouse Buildings, Goswell Road, London,

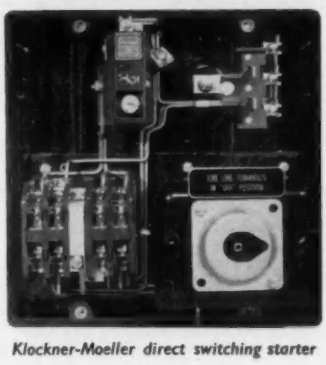


Heyes column type electric radiator



Ferranti house service meter repeater

Isopad "MIC/VAR" semi-micromantle



Klockner-Moeller direct switching starter

E.C.1. The type 1/13-i starter is mounted in a reinforced plastic dust protected wall mounting case, 8¾in by 8¾in by 6in. The cover is mechanically interlocked to the three-pole isolating switch, and the equipment includes a triple-pole contactor to B.S. 775, a three-pole thermal overload unit arranged for automatic or hand reset and a stop-start push-button unit.

300 Mc/s Voltmeter

A vacuum tube voltmeter, Type TF 1300, is the latest addition to the range produced by MARCONI INSTRUMENTS, LTD., St. Albans, Herts. The a.c. measurement range is 0·1 to 100 V, 20 c/s to 300 Mc/s. It measures d.c. up to 300 V and resistances up to 5 MΩ. The indicating meter is direct-reading on a.c., d.c., and resistance ranges, and no correction factors are necessary. Zero stability is of a high order with respect to both time and mains variation, and only one zero setting is required for all a.c. or d.c. ranges. Both a.c. and d.c. inputs are isolated from the chassis. There is no conventional chassis, and all components are mounted on the rear of the sloping front panel, which hinges upwards for ease of servicing.

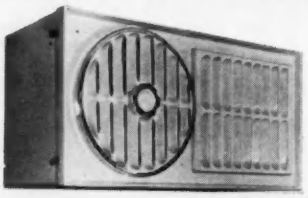
A.c. measurements are made with a lightweight, cylindrical probe allowing direct contact with the circuit under test. The rectified output from the probe is applied to one arm of a valve bridge comprising two double triodes; a second arm of the bridge is coupled to a splash-current balancing network including a potential divider across the h.t. supply and a 3 V stabiliser element. The indicating meter is automatically protected from overload.

For d.c. measurement, the input is applied directly to the bridge via the d.c. leads, and the probe diode and splash-current network are automatically disconnected. For resistance measurement, the unknown resistor is connected, by means of the d.c. leads, in series with a standard resistor and the 3 V stabilised supply that is used for splash-current balancing in a.c. measurement. The meter responds to the voltage developed across the unknown resistor. Price £47.

Marconi Instruments vacuum tube voltmeter Type TF 1300

Marine Air-Conditioning Units

A new range of self-contained air-conditioning units, claimed to be the most compact ever produced for marine use, has been introduced by THERMOTANK, LTD., 150, Helen Street, Glasgow, S.W.1. The range, known as series "P," comprises two water-cooled and two air-cooled units, all of which have been proved under tropical working conditions. The overall dimensions of the water-cooled models are 28in long by 14in high by 11½in deep, while the air-cooled units are the same fascia size but 7in deeper. The casing is acoustically, as well as thermally, insulated to ensure quiet operation, and is fitted with attachment bars to facilitate surface mounting on a wall or bulkhead.



Thermotank series "P" marine air-conditioning unit

Each unit incorporates a hermetically-sealed motor/compressor operating on Freon 22 refrigerant; cooling coil; washable nylon mesh air filter; thermostat; and a rotatable 10in diameter air discharge grille for draughtless diffusion of the air after it has been filtered, cooled and dehumidified. The water-cooled units are designed to operate with seawater temperatures up to 90 deg F, and the air-cooled models with a maximum ambient temperature of 120 deg F.

The respective loadings of the water-cooled units (models PW75 and PW100) are 4,480 and 7,200 B.Th.U/hr and the air-cooled models (PA75 and PA100) are 4,400 and 6,700 B.Th.U/hr. All units can be supplied for operation on 200/250 V, single-phase, 50 or 60 c/s supply.

Electric Cookers

A recent announcement from TRICITY COOKERS, LTD., 109, Kingsway, London, W.C.2, states that their "Viscount" electric cooker will in future be fitted with a full-width inner glass oven door as a standard feature. The basic price will be £38 17s.

Soldering Nickel-Chromium

Nickel-chromium alloy wire has good properties at high temperatures and a high electrical resistance, but difficulty is sometimes experienced in soldering this wire as the surface oxide film is not removed by ordinary fluxes. FRY'S METAL FOUNDRIES, LTD., Tandem Works, Merton Abbey, London, S.W.19, have developed a special safety flux, Type S.31, to enable the nickel-chromium alloys to be readily tinned and soldered. The flux is in liquid form, it is non-corrosive to nickel-chromium and to copper and it has no detrimental action on paper or fabric insulation. Since the flux is non-corrosive, there is no need to remove the flux residue after soldering. If it is necessary, for appearance, the residue can be removed by wiping the joint with a cloth moistened with methylated spirits.

Staircase Lighting Timer

A staircase lighting timer, Type SCS, which has been introduced by the ELECTRICAL REMOTE CONTROL CO., LTD., The Fairway, Bush Fair, Harlow New Town, Essex, can be initiated by the pressing of one of many push-buttons which are wired in parallel. The timer will automatically switch on, for the required period, up to fifty 100 W lamps. The standard timing periods are 15 and 30 seconds, and 1, 2 and 3 minutes. The timer resets automatically at the end of its timing periods. The overall dimensions of the timer are 6¼in by 4¼in by 3¼in high. The timer is priced at £9 14s and is suitable for standard a.c. supplies.

Street Lighting Plans

Bury Corporation is recommended to approve a scheme, estimated to cost £7,837, for the replacement of gas street lamps by modern electrical fittings.

Fulham Works and Highways Committee has accepted offers from two manufacturers to fit lanterns of the most recent design to a number of existing columns in certain selected roads for a trial period.

Glasgow Corporation is recommended to approve a proposal that the scheme for the conversion of street lighting from gas to electricity shall be completed during the next two years, instead of over a period of five years, at a total estimated cost of £160,400.

Kensington Works Committee is to proceed with Stage 1 of the scheme for the improvement of the street lighting of the borough, and it is proposed to place an order with the General Electric Co., Ltd., amounting to £29,066 for fluorescent lanterns and the erection of lanterns and columns.

Middlesbrough Town Council is to borrow £3,679 for electric street lighting from Queen's Square to the Transporter Bridge.

Nottingham City Council has approved expenditure of approximately £17,000 on a street lighting scheme.

Southport Lighting Committee has received the consent of the Minister of Housing and Local Government to borrow £14,930 for improved street lighting in the borough.

Surbiton Borough Council is to seek sanction to borrow £7,535 for the installation of discharge lighting in Upper Brighton Road, Hook Road and King Charles Road.

Oldbury Public Works and Planning Committee has received consent to borrow £9,500 for improved street lighting.

Wandsworth Borough Council is recommended to approve a scheme, estimated to cost £45,000, for the installation of sodium lighting in some 100 roads.

Woolwich Borough Council is recommended to approve schemes for the lighting of the second section of the L.C.C. Abbey Wood estate (£14,100) and the Wates estate, Courtlands Avenue (£3,000).

Alternator Voltage Regulation

Static Excitation System

PARTICULARLY suitable for marine auxiliary alternators, the "Accurex" static excitation system which has been introduced by the General Electric Co., Ltd., combines fast and accurate voltage regulation with the advantages of having no moving parts and reducing the overall length of the generating sets. The excitation components can be mounted, if requested, on top of the alternator as a self-contained unit, but normally the static components are supplied in a form suitable for mounting on a switchboard panel remote from the alternator. In most installations, the cost of the system is not more than that of conventional rotary exciters, and this type of regulator is applicable to sets with outputs up to the highest envisaged for marine auxiliary services. Equipments are in hand for sets with ratings up to 400 kW.

A simplified circuit of the "Accurex" scheme, showing the connections for one phase only, is given in Fig. 1. The alternator field is excited from the secondary of the current compounding transformer CT through the rectifier. Considering first the no-load condition, the terminal voltage of the alternator is applied across the saturable reactor SR, and a current, lagging this voltage by about 90 deg, will flow in the circuit formed by the reactor winding and primary A of CT, supplying the required no-load field excitation through the rectifier.

When the alternator is loaded, current passes through series coils B on the current compounding transformer. The secondary current of this transformer is the vector sum of the reactor current and a current proportional to load current. As the load power factor falls, this resultant current and the alternator excitation are increased automatically, as seen in the vector diagram, Fig. 2. Variations in alternator field resistance have little effect on the excitation current since they are swamped by the series impedance of the controlled reactor. The circuit also tends to be self-compensating for speed changes, since the reactor impedance falls with a drop in speed on account of the lower frequency, and the reactor current therefore increases.

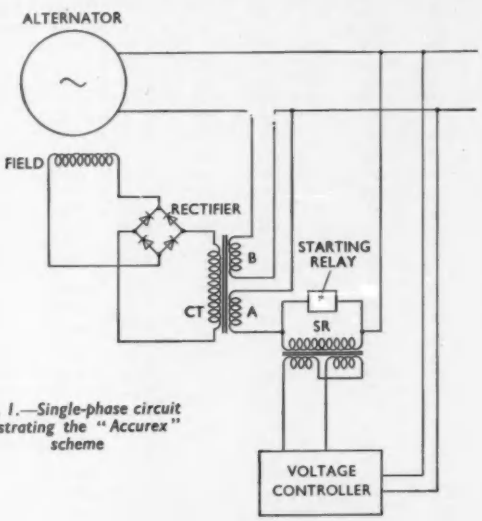


Fig. 1.—Single-phase circuit illustrating the "Accurex" scheme

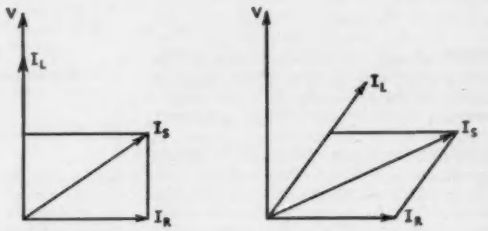


Fig. 2.—Vector diagram, showing automatic increase of alternator excitation with low power factor load

It has been assumed so far that a constant excitation is applied to the d.c. control winding of the saturable reactor. In practice, this excitation is taken from a magnetic amplifier fine control circuit and is adjusted automatically should the alternator voltage tend to change from its correct value. By varying the impedance of the a.c. winding, this results in adjustment of the alternator excitation so that correction is made for any inaccuracies in the self-excitation circuit and the alternator voltage is kept accurately constant under all conditions.

To ensure initial build-up of the alternator voltage from its residual value, a relay is included which shorts out the controlled reactor until the alternator voltage rises to about 50 per cent of normal.

The rapid response of the system is assisted by the fact that both primaries of the current compounding transformer are current-driven, thus exercising a strong forcing effect on the alternator field. The machine flux is increased rapidly by the amount necessary to counteract the voltage drop caused by transient reactance when a load is applied. In this way the magnitude and duration of alternator voltage disturbances are kept to the minimum, and very heavy loads can be applied suddenly to the alternators without undue disturbance to other consumers fed from the same machines. When half full-load current at zero power factor lagging was added to half full-load current at unity power factor on a small 415 V three-phase alternator, the "Accurex" system restored the alternator voltage to within 1 per cent of the original value in 0·15 sec after a maximum voltage dip of 5·3 per cent.

In the event of a short circuit, saturation of the static exciter components limits the excitation to about 1·5 times the full-load excitation, and the sustained short-circuit current will be about three times rated current. This characteristic facilitates the design of protective devices and ensures that a local fault will be tripped while the supply to other consumers is maintained. The system is applicable to any of the conventional systems of paralleling for even sharing of reactive kVA between alternators.

Financial Section

STOCKS and SHARES

THE annual accounts of most of the companies which end their financial years with the calendar (or thereabouts) have by now been published, and a table is produced below to compare the latest earnings of a variety of electrical or associated firms with those of the year before. The earnings figures are based on profits available for ordinary dividends and reserves after the deduction of tax and all prior charges, and are expressed as a gross percentage on the nominal capital. Rates of dividend paid for 1957 or 1957–8 are also shown, so that the "cover" for the distributions can be seen:—

	Earned %		
	1956–7	1957–8	Div. %
Aberdare Cables	33	35	17½
A.E.I.	22	22	15
Auto. Telephone	63	50(r)	17
Bowthorpe	80(s)	105	25
B.I.C.C.	38	30	12½
Bulgin, A. F.	76	84	45
Chloride Elec.	41	30	17½
Desoutter	64(s)	65	18⅞
Enfield Cable	—	3	2½
English Elec.	38	28(r)	14
Ericssons Tel.	32(s)	26	12
Ever Ready	51(s)	53	20
Henley's	21	13	11½
Hoover	80	127	50
J. & P.	—	1	5
Lancs. Dynamo	22	26	11
Laurence, Scott	75	61(r)	15
L.E.W.	40	28	12½
Newman Ind.	20	18	10
Parsons	45	40	7½
Reyrolle	47	51	17½
Switchgear & C.	42	36	22½
Taylor, T.	44	51	17½
Watford Elec.	43	64	25
West, Allen	36(s)	37	12½

(r) On capital increased by "rights" issue.
(s) Adjusted for scrip issue.

Dividend Cover

Of the twenty-five companies in the above table, eight paid larger dividends for 1957 than for the previous year, while two reduced their payments, and a majority of them secured a higher rate of earnings on their issued capital. A comparison of the figures in the last two columns gives the earnings "cover" for the dividend. In very few instances, it may be noted, is this less than twofold. A number of companies paid out less than one-third of the profits available for dividends and reserves, and one or two ploughed back more than three-quarters of their profits into their businesses. As an indication of the extent to which a dividend is conservative or otherwise, this "cover" calculation is of course nowadays an important factor in the market evaluation of a share and in the yield basis on which it is quoted.

Dividends Declared

E. K. Cole's group profit of £257,000 (after tax of £374,000) for the year ended last March is £42,000 below the previous figure, but provides very comfortably for the maintenance of the dividend at a total of 17½ per cent, the rate paid also on the three previous occasions: it involves the

Price Changes in

Company or Board	Nom. Value	Middle price 30th June	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield %	1958 Highest	1958 Lowest
Gilt-edged Stocks						£ s d		
Brit. Elec. 1968/73	100	75½		3	3	3 19 6	75½	72
Brit. Elec. 1974/77	100	73		3	3	4 2 3	72½	68½
Brit. Elec. 1976/79	100	76½		3½	3½	4 11 6	76½	72
Brit. Elec. 1974/79	100	86½	−½	4½	4½	4 18 3	87	82½
Overseas Electric Supply								
Calcutta Elec.	£1	16/6		6†	6·8†	8 5 0†	16/9	15/-
East African Power	£1	18/6		7	7½	8 2 3	19/3	17/6
Nigerian Elec.	£1	15/-		10	10	13 6 9	17/-	14/9
Perak Hydro-Elec.	£1	14/-	−6d	10	12½	17 17 0	15/6	14/-
Electrical Shares								
Aberdare Holdings	5/-	11/9		17½	17½	7 9 0	11/9	9/9
Aerialite	1/-	6/9	−3d	48	51½	7 12 6	7/-	5/1
Allen, W. H.	£1	37/-		10	11	5 19 0	37/-	32/9
Anglo-Portuguese Tel.	£1	25/3x.d.		8	9	7 2 6	27/3	19/9
Aron Elec. Ord.	£1	55/-		15	15	5 9 0	57/6	53/-
Assoc. Elec. Ord.	£1	50/-		15	15	6 0 0	51/3	46/6
Automatic Tel. & El.	£1	65/-		17	17	5 4 6	66/3	57/-
Babcock & Wilcox	£1	47/9		15	13‡	5 8 9	52/9	41/9
Bakelite	10/-	19/3		15	15	7 15 9	21/-	17/6
Baldwin, H. J.	2/-	2/9		20	20	14 10 9	3/9	2/9
Barry's Electric	5/-	7/-		—	10	7 2 9	7/6	5/9
British Aluminium	£1	43/9		12	12	5 9 6	47/-	37/-
Brit. Elec. Traction: Def. Ord. "A"	5/-	23/-	−6d	25	25	5 8 9	24/-	19/6
B.I. Callender's	£1	43/6	−1/6	12½	12½	5 15 0	45/6	38/9
B.I. Callender's 6% Pref.	£1	19/-		6	6	6 6 3	20/3	19/-
British Tabulating	£1	48/-	+6d	9	10	4 3 6	48/-	38/6
British Thermostat	5/-	30/-	+9d	25	30	5 0 0	30/-	19/9
British Vac. Cleaner	5/-	4/9		10	10	10 10 6	5/3	4/6
Brook Motors	10/-	37/6		25	25	6 13 3	37/6	33/3
Bulgin, A. F.	1/-	5/3	+3d	40	45	8 11 6	5/6	4/7
Bulpitts	5/-	7/6		—	12½‡	8 6 9	7/6	7/6
Burco Dean	5/-	9/-		20	22½	8 6 9*	9/6	7/9
Cable & Wireless: Ord.	5/-	10/6		10	10†*	4 15 3	10/6	8/-
4% Loan	100	93¼x.d.		4	4	4 5 6	94½	89
Chloride El. Storage "A"	£1	57/6	−1/3	17½	17½	6 1 9	62/-	55/6
Clarke Chapman	£1	112/6		27½	27½	4 17 9	7½	5½
Cole, E. K.	5/-	16/-	−1/9	17½	17½	5 9 6	18/-	15/6
Cossor, A. C.	5/-	4/9		Nil	2½	2 12 9	5/6	4/4
Crabtree	10/-	28/-		20	20	7 2 9	28/-	24/4
Crompton Parkinson Ord.	5/-	10/6		16	16	5 1 6*	10/6	8/3
De La Rue	10/-	24/9	−1/-	35	17½*	7 1 6	26/3	20/9
Decca "A"	4/-	25/-	−1/3	43¾	43¾	7 0 0	27/6	21/3
Desoutter	5/-	15/6	+6d	32½	18¾*	6 1 0	15/6	13/6
Dewhurst	2/-	8/-		16½	20	5 0 0	8/-	6/9
Dictograph Tel.	2/-	6/3		20	20*	6 8 0	6/3	4/7
Dubilier Condenser	1/-	4/3		30	30	4 14 3*	4/3	3/1
Duport	5/-	7/9		25	25	8 1 3*	9/4	7/9
E.M.I.	10/-	34/6	−9d	15	15	4 7 0	35/3	27/6
Electrical Components	5/-	7/6		25	12½*	8 6 9	8/-	7/-
Elec. Construction	£1	25/-		8½	8½	6 16 0	25/-	21/-
Elliott-Automation	5/-	14/6		—	10‡	3 9 0	14/6	11/6
Enfield Cable Ord.	£1	14/-	−1/-	Nil	2½	3 11 3	17/-	10/9
English Electric	£1	52/6		14	14	5 6 9	56/3	44/-
English Electric 3½% Pref.	£1	12/-		3½	3½	6 5 0	12/3	11/9
Ericsson Tel.	5/-	20/3	−3d	22†	12*†	2 19 3†	21/-	17/6
Ever Ready	5/-	18/9	−6d	37½	20*	5 6 9	19/3	13/9
Falk Stadelmann	£1	38/9x.d.		17½	17½	9 0 9	38/9	35/-

The above quotations are based upon middle prices in the Stock Exchange Daily Official List.
* After scrip issue. † Free of income tax. ‡ Dividend indicated.

distribution of not much more than one-third of the net surplus available. Quoted lower, at 16s, after the announcements, the 5s shares of the company are on a yield basis of nearly 5½ per cent. There has not been much change in B.E.T. "A" deferred shares at around 23s, since the publication of the results. This company also is paying the same dividend as before from rather lower earnings. On the 25 per cent payment the yield on the shares works out at a fraction under 5½ per cent.

Ever Ready Prospects

Having reviewed another year of good trading and record earnings, the chairman of Ever Ready (Great Britain) advised shareholders in the full report that a good start had been made to the current year, during which sales had been running above those in the corresponding months of 1957. For the twelve months ended last February the net profit improved to £893,000, after tax, and the dividend is being raised by the equivalent of 1¾ to 20 per cent. The new rate is covered about 2½ times by the net distributable surplus, and Mr. Rowbotham calculated that considerable advantage would be derived from this year's change in the profits tax. The 5s shares have been a strong market in recent weeks. At 18s 9d they yield just over 5½ per cent.

Globe Telegraph Capital

The 5s ordinary shares of the Globe Telegraph & Trust have been quoted at around 11s since the announcement that the company is seeking authority for a free scrip issue, in the proportion of one new share for every twelve held, and for a cash offer of new shares, at 5s each, in the same proportion. On the basis of the 10 per cent dividend paid for each of the last two financial years, the present yield on the shares (ignoring "rights" to the proposed issues) is just over 4½ per cent, which testifies to their popularity with investors who like to have their capital spread in effect over a very wide range of interests under experienced management. At the date of the last balance sheet, dated June, 1957, the Trust held quoted investments standing in the books at a figure of over £9 million, and having a market value of £14·4 million at that time, as well as unquoted securities at £2·3 million. A final dividend for the year just ended will be due to be declared this month.

Lancashire Dynamo

The £1 shares of Lancashire Dynamo have further improved to around 40s, their best price of this year, since the annual meeting, at which Mr. S. F. Steward, the chairman, was able to refer to the group profit of £747,000 for 1957 as the highest yet achieved. The dividend is being kept at a total of 11 per cent for the third year in succession and is covered some 2½ times over by the net surplus available. In his speech the chairman put emphasis on the need for building up reserves and for continuing expenditure on development. He mentioned the group's spread of interests and the complementary nature of the products as having done much towards the maintenance of the company's position and as a source of strength in the competitive conditions prevailing. There is a yield of 5½ per cent on the shares.

Electrical Investments

Company or Board	Nom. Value	Middle price 30th June	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield %	1958 Highest	1958 Lowest
Electrical Shares—continued						£ s d		
G.E.C. Ord.	£1	32/6	−1/3	14	12½	7 14 0	38/9	29/3
G.E.C. 6½% Pref.	£1	20/3		6½	6½	6 8 6	21/3	20/3
General Cables	5/-	10/9		30	24	—	11/9	10/9
Greenwood & Batley	£1	48/3		17½	20	8 5 9	48/3	45/-
Hackbridge Holdings	5/-	13/9	+1/-	30	20	7 5 6	13/9	7/6
Hackbridge & Hewittic	5/-	11/6	−6d	20	20	8 14 0	12/-	9/7
Head Wrightson	5/-	21/9	−6d	22½	17½*	4 0 3	22/3	16/9
Heatrae	2/-	5/6		15	20	7 5 6	5/6	4/-
Henley's	10/-	11/-		11½	11½	10 9 0	14/6	10/6
Holophane	5/-	13/6		30	37½	8 6 9*	13/9	12/6
Hoover	5/-	42/-	−1/-	50	50	5 19 0	43/-	31/-
I.C.I.	£1	28/9x.c.	−1/3	10	8	5 11 3*	30/3	23/9
Intl. Combustion	5/-	26/6		22½	25	4 14 3	26/6	19/3
Johnson & Phillips	£1	18/-	−9d	10	5	5 11 0	25/-	15/-
Lancashire Dynamo	£1	40/-		11	11	5 10 0	40/-	28/6
Laurence, Scott	5/-	14/9		15	15	5 1 9	14/9	12/6
Lister, R. A.	£1	24/6		10	10	8 3 3	26/3	23/-
London Elec. Wire	£1	44/3	−9d	12½	12½	5 13 0	45/-	39/6
Lucas, J.	£1	35/6	+6d	7½	7½	4 4 6	35/6	27/9
Marconi Marine	£1	32/-		10	10	6 5 0	32/-	29/-
Marryat & Scott	2/-	14/-	+3d	30	35	5 0 0	14/-	10/3
Mather & Platt	£1	60/-		15	15	5 0 0	60/-	43/9
Metal Industries	£1	31/6	+9d	9	14	—	31/6	22/9
Midland Elec. Mfg.	£1	46/3		12½	12½	5 8 0	48/3	44/-
Morphy-Richards	4/-	16/3		50	20*	4 18 6	16/9	14/6
Murex	£1	58/3		20	20	6 17 3	58/3	53/3
Newman Ind.	2/-	2/3		10	10	8 17 9	2/9	2/3
Oldham & Son	1/-	2/6		17½	17½	7 0 0	2/7	2/3
Parnall (Yate)	5/-	13/9		12	12	4 7 3	14/3	5/9
Parsons, C. A.	£1	49/-	−1/6	8½	7½*	3 1 3	53/6	43/-
Plessey	10/-	58/6	−2/-	30	30	5 2 6	60/6	55/-
Pye "A" Deferred	5/-	12/-		12½	12½	5 4 3	13/9	10/-
Reyrolle	£1	78/9	−2/6	17½	17½	4 9 0	84/6	73/6
Rheostatic	4/-	6/-		12½	12½	8 6 9	8/-	6/-
Richardsons Westgarth	10/-	13/6x.d.		16½	8½*	6 3 6	15/-	13/-
Scottish Cables	4/-	14/3		27½	27½	7 14 6	14/3	12/3
Simon-Carves	5/-	27/-		20	25	4 12 6	27/9	22/6
Smith (England), S.	4/-	8/9		17½	20	4 11 6*	8/9	7/-
Southern Areas	£1	9/3		7½	Nil	Nil	13/9	9/3
Strand Elec.	5/-	4/9		15	15	15 15 9	6/3	4/9
Sturtevant	5/-	15/3		15†	15†	4 18 3†	18/-	14/9
Sun Elec.	£1	47/6		25	25	10 10 6	47/6	47/3
Switchgear & Cowans	5/-	11/6		25	22½	9 15 9	11/9	8/9
Taylor Tunnicliff	5/-	13/3		15	17½	6 12 0	13/9	11/9
T.C.C.	10/-	35/-		25	25	7 2 9	38/6	35/-
T.C. & M.	£1	23/-		8½	8½‡	7 7 9	27/-	20/-
Telephone Mfg.	5/-	4/6x.d.	−3d	10	10	11 2 0	5/3	4/6
Telephone Rentals	5/-	11/-		12½	12½	5 13 9	11/-	9/9
Thompson (John)	5/-	24/-		25	25	5 4 3	27/-	23/-
Thorn Elec. "A"	5/-	22/6		15	17½	3 17 9	22/6	17/-
Thornycroft	£1	26/3	+6d	12½	12½	9 10 6	27/9	21/-
Tube Investments	£1	55/-		13¾	15	5 9 0	55/-	48/3
Vactric	5/-	14/3		25	25	8 15 6	15/6	14/3
Veritys	5/-	5/3		12½	12½	11 18 3	6/9	5/3
Walsall Conduits	4/-	14/3x.d.		20	22½	6 6 3	14/3	11/-
Ward & Goldstone	5/-	27/6	−6d	35	40	3 12 9*	28/6	23/6
Watford	2/-	6/-		25	25	6 13 3*	7/6	5/-
Westinghouse	£1	40/-		18	10*	5 0 0	40/-	32/3
West, Allen	5/-	11/-	+3d	15	12½*	5 13 6	12/-	9/3
Wolf Electric	5/-	6/9		20	10*	7 8 3	9/-	6/9

REPORTS and DIVIDENDS

Reliance-Clifton Cables & Industrial Products, Ltd. — This company's accounts for 1957 were summarised in our issue of 30th May. The annual meeting was held on 25th June when, in the course of his speech, the chairman, Sir Robert Renwick, Bt., said that the profit was satisfactory for a difficult year. Referring to the company's investments, he said that a new company, Belfast Cables, Ltd., had been formed to operate a factory being built by the Northern Ireland Government and leased to the company.

Adverse trading conditions continued during the year. Although the fall in the price of copper had not involved them in considerable loss it had been impossible, with selling prices drifting downwards, to recover increases in wages and operating costs. Restriction of credit and of expenditure by the nationalised industries, particularly the Post Office, had had adverse effects.

The provision of plant had been geared to the continuance of an expanding demand and much new plant had had to be installed for producing plastic cables which were replacing many traditional types with increasing momentum. Slackening demand had led to a rapid running down of order books and normal competition seemed to have given way to acceptance of orders at unremunerative prices.

Conditions had not improved in the current year. Although the reductions in the bank rate might presage further easements in Government policy it would be unwise to think that the main problem would be quickly resolved. But if the immediate prospect was unfavourable the long-term aspect gave little cause for anxiety as there was no foreseeable saturation point for electricity and therefore for cables. The case for providing capital for full telephone development should stand high in the queue.

The company's sales to date were appreciably higher than in 1957 but for many of their products depressed prices, although offset by manufacturing economies, did not leave a satisfactory margin of profit. Nevertheless the company's position was such that they could regard the present uncomfortable trading conditions without serious concern.

Thomas De La Rue & Co., Ltd.—The group trading surplus for the year to 29th March last, including the United Kingdom subsidiary, Formica, and the French subsidiary, amounted to £1,349,296, as compared with £1,134,627 in the preceding year for Thomas De La Rue only. Taxation absorbs £918,648 and the group net profits are £549,868 (against £504,212), of which £458,324 is attributable to the holding company. No consolidated accounts were presented for 1956-57, but, as a guide to comparison the results of Thomas De La Rue for that year have been shown after adjusting the dividends received from French interests. A surplus arising as a result of the plastics business being taken over by Formica, Ltd., amounting to £400,000, has been credited to capital reserve in the consolidated accounts, together with £40,075 net surplus arising on other capital transactions. It is proposed to pay a final dividend of 12½ per cent on capital doubled by a scrip issue, which is equivalent to the final dividend paid last year. The interim dividend was maintained at 10 per cent on the old capital.

Richardsons, Westgarth Group.—This group, which includes the Parsons Marine Turbine Co. and the Humber Graving Dock Co., reports a total output valued at £16,105,080 for 1957-58, as compared with £12,436,488 for the preceding year. The group profit is £1,314,046 (£1,358,328), plus £153,137 from Parsons Marine Turbine and Humber Graving Dock. The final dividend on capital doubled by a capitalisation issue is 5 per cent; the interim distribution was 6¼ per cent on the former capital. For 1956-57 a total of 16¼ per cent was paid.

Simms Motor & Electronic Corporation, Ltd.—Group profits for 1957 amounted to £927,861 (against £841,711) and after deducting £503,980 (£461,916) tax the net figure was £423,881 (£379,795). The final dividend of 9½ per cent on capital increased by a 200 per cent scrip issue makes the equivalent of 12½ per cent for the year, against the equivalent of 11¼ per cent for 1956.

E. K. Cole, Ltd., propose to pay a final dividend of 10 per cent on the ordinary stock, again making 17½ per cent for 1957-58. The group's net profit, after providing for depreciation, was £684,990, against £778,574 for 1956-57, and after charging taxation and unsecured loan interest, and adding a taxation provision no longer required, a net balance of £281,510 (£359,074) is carried to consolidated appropriation account.

Renold Chains, Ltd., has declared a final dividend of 9½ per cent, again making 12½ per cent for the year. Group profits were £1,435,798, compared with £1,041,066, before taxation of £807,745 (£627,091). The company proposes to make a "rights" issue of 1,379,804 ordinary shares to existing shareholders at the price of 30s a share in the ratio of three to each £8 of ordinary stock held.

Rediffusion, Ltd.—A final dividend of 4 per cent tax free is announced, making 9 per cent for the year ended 31st March last, and also a special dividend of 3½ per cent tax free which will be charged against the current year's accounts. The final dividend will be paid on £4,097,247 and the special dividend on an additional 200,000 £1 ordinary shares issued since the balance sheet date. The 1956-57 total was 12½ per cent, tax free, on the smaller capital. Group trading profits advanced from £3,870,420 to £4,077,384 and the net profit from £888,218 to £914,092.

Greenwood & Batley, Ltd., are raising their final dividend from 12½ to 15 per cent, making the total distribution for the year to 31st March last 20 per cent (against 17½ per cent). After providing £143,030 (£135,267) for taxation the net profit was £124,293 (£114,705).

Relay Exchanges, Ltd., have completed arrangements for taking over the share capital of Goodmans Industries, Ltd. The purchase price is £600,000, satisfied by the allotment, credited as fully paid, of 374,000 5s ordinary shares in Relay Exchanges, Ltd. The acquisition dates from 1st January, 1958, and Mrs. M. Newland is remaining on Goodmans' board as joint managing director.

Yorkshire Copper Works (Holdings), Ltd., has declared an interim dividend of 6 per cent. It is stated that this is based on results for the six months to 31st January last when the business was merged in the Metals Division of the I.C.I. and it should not be taken as an indication of the results during the first six months of the new organisation or of the final dividend.

Meters, Ltd., report a group profit of £46,598 (against £32,511) and a net profit for the parent company of £17,350 (£9,616). The ordinary dividend is maintained at 6 per cent by a final payment of 3½ per cent.

Ruston & Hornsby, Ltd., are maintaining their ordinary dividend at 9 per cent. Group net profits for 1957-58 amounted to £645,684 (against £693,956), of which the subsidiaries retained £139,680 (£81,300).

I.S.T. Insulations, Ltd., report a group net profit of £20,824 for the past year, against £25,042 for 1956-57. The dividend is maintained at 16¼ per cent.

Pye (Ireland), Ltd.—The group trading profit for the year ended 31st March last was £69,586 (£60,751) and the net income £39,892 (£30,054). The company is again paying an ordinary dividend of 15 per cent.

W. & T. Avery, Ltd.—From a group net profit of £1,226,617, against £1,247,239, a final ordinary dividend of 10 per cent is recommended, again making 15 per cent for the year. Sanction is being sought to a one-for-two capitalisation issue.

Johnson, Matthey & Co., Ltd., have declared a final dividend of 7 per cent, maintaining the year's distribution at 10 per cent. Group net profits amounted to £934,492, against £945,498.

Keith Blackman, Ltd., are raising their dividend for the past year from 15 to 17½ per cent. The profit, before

taxation, was £425,003, against £342,239. The general reserve again receives £75,000.

Metal Industries, Ltd.—The group profit for 1957-58, after taxation, was £779,753 (against £800,097). Of this £250,000 is transferred to reserve. A final ordinary dividend of 10 per cent (against 6 per cent) is proposed, making 14 per cent for the year. For 1956-57 9 per cent was paid but there was also a bonus of 5 per cent.

Belliss & Morcom, Ltd.—From a group net profit of £74,626 (against £36,855) this company is paying a final dividend of 7 per cent, again making 11 per cent for the year. A sum of £62,331 (£88,295) is placed to reserve.

John Thompson Group.—The chairman, Sir Edward Thompson, states that there was an improvement in output during the first quarter of this year and with the amount of work in hand the outlook is " not unsatisfactory."

Hackbridge & Hewittic Electric Co., Ltd.—From a net profit of £164,816 (against £153,499) the company is paying a final ordinary dividend of 15 per cent, again making 20 per cent for the year.

Dewhurst & Partner, Ltd., have announced an interim dividend of 5 per cent, the same as last year.

New Companies

Callender's Cable and Construction Co., Ltd.—Registered 18th June. Capital £2. Manufacturers of and dealers in all kinds of insulated cables and wires for the transmission of electrical energy, etc. Directors: C. H. B. Pipkin (director of United Telephone Cables, Ltd., etc.) and G. J. Poole (director of W. T. Glover & Sons, Ltd., etc.). Secretary: J. P. Hourston. Regd. office: Norfolk House, Norfolk Street, W.C.2.

Colwood Electrical Installations, Ltd.—Registered 28th May. Capital £1,000. Manufacturers and repairers of and dealers in electrical plant, machinery, appliances and supplies of all kinds, including radio, television and gramophone apparatus, etc. Directors: P. J. Kimber and D. J. Bird. Solicitors: Kennedy, Genese & Syson, 47, Queen Anne Street, W.1.

T. E. Roberts (King St.), Ltd.—Registered 3rd June. Capital £2,000. Manufacturers of and dealers in electrical apparatus and equipment and goods of all kinds, etc. Directors: T. E. Roberts and Mrs. Hilda Roberts. Regd. office: 9, Centenary Buildings, King Street, Wrexham.

C. H. Moss, Ltd.—Registered 3rd June. Capital £2,000. Manufacturers of and dealers in and repairers of electrical goods of all kinds, etc. Directors: C. H. Moss, Mrs. Iris A. Moss and C. Holmes. Regd. office: 52, Rolleston Drive, Arnold, Notts.

D. Broadhead (Electrical), Ltd.—Registered 4th June. Capital £5,000. Manufacturers of and dealers in artificial lighting apparatus, electrical plant, radio and television sets, etc. Directors: D. Broadhead and Mrs. Florence B. A. Broadhead. Regd. office: 67, Doncaster Road, Goldthorpe, nr. Rotherham.

Harvey Speciality Distributors, Ltd.—Registered 4th June. Capital £100. Electrical and mechanical engineers, electricians, scientific instrument makers, manufacturers of and dealers in electrical apparatus, etc. Directors: R. Harvey and Mrs. Patricia Harvey. Regd. office: 11, Maidstone Road, Paddock Wood, Kent.

Warmsley Bros. (Electronics), Ltd.—Registered 15th May. Capital £3,000. Retailers, wholesalers, manufacturers of and dealers in radio and television sets and apparatus, washing machines, dryers, etc. Directors: W. J. A. Warmsley, Anne Warmsley, F. L. Warmsley, Kathleen Warmsley and J. T. Middlebrook. Regd. office: 216/216a, Southampton Way, Camberwell, S.E.5.

Solartron-Rheem, Ltd.—Registered 21st May. Capital £1,000. To enter into an agreement with Solartron Electronic Group, Ltd., and Rheem Manufacturing Co., and to undertake every kind of research, development and experimental work in connection with electrical, electronic, nuclear, mechanical, precision and general engineering, etc. Directors: C. G. Bailey, R. Catherall, E. E. Jones, A. Handschumacher, A. F. Taylor and A. L. Walker. Solicitors: Slaughter & May, 18, Austin Friars, E.C.2.

Kitley Electrics, Ltd.—Registered 27th May. Capital £100. Manufacturers, distributors, wholesalers, retailers, importers and exporters of electrical supplies, renters and hirers of, dealers in and repairers of television and radio receivers and transmitters, etc. Directors: F. G. Kitley and Mrs. Kathleen R. Kitley. Regd. office: 267, Bitterne Road, Bitterne, Southampton.

Electrical & General Supplies, Ltd.—Registered 21st May. Capital £1,000. Electrical engineers and contractors, manufacturers, importers and exporters of and dealers in radio apparatus, television, etc. N. N. Moore is the first director. Regd. office: 16, The Traverse, Bury St. Edmunds.

J. A. Halpin & Sons, Ltd.—Registered 27th May. Capital £3,000. To acquire the business of radio, television, refrigeration, electronic and electrical engineers and dealers in and retailers of radio, television, electrical appliances and component parts carried on by J. A. Halpin at Southampton, etc. Directors: J. A. Halpin and Mrs. Celia D. Halpin. Regd. office: 34, Carlton Crescent, Southampton.

Increases of Capital

Standard Telephones and Cables, Ltd.—Increased by £3,000,000 in £1 ordinary shares, beyond the registered capital of £9,000,000.

Fitter & Poulton, Ltd.—Increased by £48,000 in £1 shares, beyond the registered capital of £2,000.

Bankruptcies

T. R. Dillon, lately carrying on business with two others under the style of Hainault Electrics at 19, Brunner Road, Walthamstow, E.17.—Receiving order made 11th June on debtor's own petition.

W. H. Rosindale, lately carrying on business as an electrical contractor at 12 and 14, Paragon Arcade, Paragon Street, Hull.—First meeting held 2nd July. Public examination 1st September at the Guildhall, Hull.

J. Summerly, 93, Mowbray Road, South Shields, electrician.—Application for discharge to be heard on 1st August at the County Court, John Street, Sunderland.

Liquidation

White & Co. Beeston (Notts.), Ltd., general electrical and mechanical engineers, Swiss Mills, Cross Street, Beeston, Notts.—Winding up voluntarily. Liquidator, Mr. R. A. Hawken, Bank Chambers, 1, John Street, Bedford Row, London, W.C.1, appointed 17th June.

TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 11th July:—

TALYMIKE. No. 766,005. Class 9. Electrical apparatus for use in juxtaposition with or at a distance from machine tools for controlling the operation thereof.—Taylor, Taylor & Hobson, Ltd., 104, Stoughton Street, Leicester.

ELEXA (design). No. 770,785. Class 9. Electrical apparatus and instruments.—Elexa, Anderlecht, Belgium. Address for service, c/o C. L. Wilson, Phœnix Chambers, 84, Colmore Row, Birmingham, 3.

DUOMATIC. No. 771,061. Class 9. Electrically operated combined adding and listing machines.—Office Machinery, Ltd., Omal House, 169, Tottenham Court Road, London, W.1.

TELEOPTIC. No. 773,564. Class 9. Light-filtering screens, being optical devices for attachment to television receiving apparatus for use in reducing dazzle and improving picture definition.—C. J. Olliff, trading as Teleoptics & Television Accessories, 55, Park Lane, London, W.1.

SYNCRAMENTAL. No. 772,775. Class 9. Solenoid operated devices for use in converting electrical impulses into linear and rotary mechanical action.—G. H. Leland Inc., Dayton, Ohio, U.S.A. Address for service, c/o Abel & Imray, Quality House, Quality Court, Chancery Lane, London, W.C.2.

PYROMAXIM. No. 773,870. Class 9. Electrical and electronic apparatus for indicating and automatically controlling temperature, and electric switches therefor.—Sifam Electrical Instrument Co., Ltd., Leigh Court, Higher Lincombe Road, Torquay, Devon.

COUNTEC. No. 774,144. Class 9. Electronic instruments and apparatus and parts.—Sargrove Electronics, Ltd., Alexandra Road, Hounslow, Middx.

AIRMATIC. No. 774,445. MOTORMATIC. No. 774,446. Class 9. Electrical apparatus for automatically controlling the operation of the engines of stand-by electric generators and for giving audible or visual warnings of failures in the operation of such engines.—Blackstone & Co., Ltd., Rutland Engineering Works, Ryhall Road, Stamford, Lincs.

REGISTEC. No. 774,145. Class 9. Electrical apparatus and instruments and parts.—Sargrove Electronics, Ltd., Alexandra Road, Hounslow, Middx.

DIGICATOR. No. 775,738. Class 9. Electronic and electrical apparatus and instruments.—Solartron Electronic Group, Ltd., Solartron Works, Queens Road, Thames Ditton, Surrey.

EASI-MATIC. No. 776,141. Class 9. Electric flat irons.—Easipower, Ltd., 27, Albemarle Street, London, W.1.

POLYTEL. No. 772,948. Class 17. Insulating tubes for telephone cables.—British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk Street, London, W.C.2.

NEXT WEEK'S EVENTS

Organisers of electrical functions are advised to make use of the " Electrical Review" clearing house, Room 221, Dorset House, Stamford Street, London, S.E.1, to ascertain that proposed dates for their functions do not clash with others already arranged

Tuesday, 8th July

LONDON.—Connaught Rooms, W.C.2, 12.30 for 1 p.m. Electrical Industries Club. Ladies' luncheon.

Thursday, 10th July

LONDON.—At the Cable Makers' Association, High Holborn House, W.C.1, 10.30 a.m. Electrical Industries Benevolent Association. Annual general meeting.

DENHAM.—Denham Golf Club. Electrical Industries National Golf Championship. London area golf meeting.

Thursday, 10th July, to Wednesday, 16th July

MANCHESTER.—College of Science and Technology. Institution of Electronics, Northern Division, Annual Electronics Exhibition and Convention.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (3s 6d each including postage) are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2

1953

29126. Electric & Musical Industries, Ltd.—Automatic control systems especially for machine tools. 8th October, 1954. (Cognate applications, 32055, 19th November, 1953, and 32056, 19th November, 1953.) (797503.)

33813. British Thomson-Houston Co., Ltd.—Electric arc furnaces. 3rd December, 1954. (797393.)

1954

1746. A.B. Metal Products, Ltd.—Variable potentiometers or resistors. 11th March, 1954. (797512.)

4145. Electric & Musical Industries, Ltd.—Automatic machines. 7th February, 1955. (797504.)

5008. General Electric Co., Ltd., Biggs, A. J., Bligh, N. R., and Bridges, D. H.—Colour television systems. 19th May, 1955. (797343.)

5835. Electric & Musical Industries, Ltd.—Magnetisable iron oxides. 17th February, 1955. (797586.)

21338. Siemens-Schuckertwerke Akt.-Ges.—Methods of generating electrical energy involving accurately maintaining the rated voltage of a synchronous generator or of a similar generator. 21st July, 1954. (797272.)

22720. Brookhirst Switchgear, Ltd., and Butterworth, E. M.—Thermal overload relay devices for the protection of electrical apparatus. 5th August, 1955. (797587.)

25347. Protona Produktionsges fuer Elektro-Akustische Geraete Ges.—Miniature magnetic sound recording and reproducing device. 1st September, 1954. (797274.)

26522. Newman, P. H.—Container for storage of radioactive materials. 7th September, 1955. (797275.)

29474. Sautier & Jaeger.—Line scanning time base for television receivers. 13th October, 1954. (797517.)

32230. Parsons & Co., Ltd., C. A.—Turbine blades. 15th December, 1955. (797521.)

32748. Siemens-Schuckertwerke Akt.-Ges.—Electric semi-conductor devices. 11th November, 1954. (797505.) 33824. Semi-conductor devices. 22nd November, 1954. (797506.)

35473. Russell, R. L.—Phase rotation sense indicator for polyphase electrical systems. 7th March, 1956. (797591.)

37809. Vereinigte Aluminium-Werke Akt.-Ges.—Plant for carrying out fusion electrolysis. 31st December, 1954. (797428.)

37825. Mullard Radio Valve Co., Ltd.—Travelling wave tubes. 31st December, 1954. (797352.)

1955

722. I.T.E. Circuit Breaker Co.—High voltage magnetic arc extinguishing means for electric circuit-breakers. 10th January, 1955. (797412.)

3052. English Electric Co., Ltd.—Automatic programme control systems. 27th January, 1956. (797419.)

4927. Kelvin & Hughes, Ltd.—Automatic control systems. 16th February, 1956. (797593.)

5168. Dehn, S. G. (Remington Rand, Inc.).—Electronic data processing system. 21st February, 1955. (797411.)

5542. Cossor, Ltd., A. C.—Secondary radar systems. 20th February, 1956. (797356.)

7098. Christiania Spigerverk.—A.c. electric furnaces. 10th March, 1955. (797279.)

7513. International Business Machines Corporation.—Magnetic transducer head assembly. 15th March, 1955. (797594.)

9825. Postmaster General.—Phase shifting networks. 20th February, 1956. (797595.)

15575. Standard Electronics Corporation.—Electrical connector, particularly for the pins of a valve. 31st May, 1955. (797599.)

16579. Pirelli-General Cable Works, Ltd.—Gas-shielded electric-arc welding of tubes or the like. 4th September, 1956. (797363.)

16708. Licentia Patent-Verwaltungs-Ges.—Mechanical current convertor. 10th June, 1955. (Addition to 749887.) (797534.)

17983. General Electric Co., Ltd.—Braking arrangements for electric motors. 7th June, 1956. (797436.)

19001. National Research Development Corporation.—Induction motors. 18th June, 1956. (797290.)

19180. English Electric Co., Ltd.—Low phase shift frequency-sensitive filters. 1st July, 1955. (797397.)

20063. Decca Record Co., Ltd.—Pulse radar apparatus. 11th July, 1956. (797367.)

21438. Western Electric Co., Inc.—Electron discharge devices. 25th July, 1955. (797539.)

22518. Decca Record Co., Ltd.—Travelling wave tube amplifiers. 20th July, 1956. (797292.)

23222. Associated Electrical Industries, Ltd.—Bridge network balance detectors. 31st July, 1956. (797542.)

23754. General Electric Co., Ltd.—Heat transfer arrangements. 13th August, 1956. (797608.)

25655. British Thomson-Houston Co., Ltd.—Electric lamps. 14th August, 1956. (797441.)

27556. General Electric Co., Ltd., and Jackets, A. E.—Junction transistor multivibrators. 27th September, 1956. (797398.)

28053. Proctor Electric Co.—Thermal wattage controller. 3rd October, 1955. (797553.)

28255. Collins Radio Co.—Detector, noise limiter, and delayed a.v.c. circuit. 4th October, 1955. (797554.)

28558. Werner Genest Ges. für Isolierungen.—Low reflection absorbers for absorbing or minimising of radio waves. 6th October, 1955. (Addition to 776158.) (797610.)

28820. Bendix Aviation Corporation.—Regulating system for a motor generator system. 10th October, 1955. (797444.)

29440. Rolls-Royce, Ltd.—Electrical resistance welding apparatus. 4th January, 1957. (797555.)

29767. General Electric Co., Ltd.—Production of semiconductor bodies. 18th October, 1956. (797377.)

30020. Siemens-Reiniger-Werke Akt.-Ges.—X-ray screen image photography apparatus. 20th October, 1955. (797297.)

30776. Murphy Radio, Ltd.—Television receivers having automatic gain control. 26th October, 1956. (797556.)

31880. Slepian, J.—Separation of isotopes in electric and magnetic fields. 8th November, 1955. (797558.)

32200. Addison Electric Co., Ltd.—Apparatus for making electrical measurements upon coated conductors. 14th June, 1956. (797399.)

32301. Philips Electrical Industries, Ltd.—Colour television receivers. 11th November, 1955. (797378.)

34173. British Thomson-Houston Co., Ltd.—Dynamo-electric machines. 15th November, 1956. (797300.)

36099. Muirhead & Co., Ltd.—Electrolytic standard cells. 21st March, 1956. (797381.)

36108. International Business Machines Corporation.—Electric motor speed control systems. 16th December, 1955. (797559.)

36387. General Electric Co., Ltd.—Manufacture of semi-conductor devices. 5th December, 1956. (797304.)

36973. General Electric Co., Ltd.—Electric amplifier arrangements. 18th December, 1956. (797306.)

37369. General Electric Co.—Programming control systems. 30th December, 1955. (797451.)

1956

160. Western Electric Co.—Polymer laminates and methods of making them. 3rd January, 1956. (797615.)

382. Power-Gas Corporation, Ltd.—Containers for radioactive materials. 31st December, 1956. (797309.)

1850. British Dielectric Research, Ltd.—Electric capacitors 18th January, 1957. (797310.)

6692. Burroughs Corporation.—Electric pin-board cross-connecting device. 2nd March, 1956. (797457.)

9038. Hermann, F.—Electrodes for primary and secondary batteries or methods of producing same. 22nd March, 1956. (797404.)

9899. Lonza Electric & Chemical Works, Ltd.—Method of activating the cathode surfaces of electrolytic hydrogen generators. 29th March, 1956. (797565.)

10898. Western Electric Co., Inc.—Electrical devices incorporating elements of ferromagnetic ceramic materials. 10th April, 1956. (797566.)

11327. Philips Electrical Industries, Ltd.—Stud-welding pistols. 13th April, 1956. (797462.)

14190. Bosch, Ges., R.—Voltage regulator systems. 8th May, 1956. (797387.)

16111. Siemens & Halske Akt.-Ges.—Systems for producing visible signals. 24th May, 1956. (797570.)

21107. Addison Electric Co., Ltd.—Capacitive electrode. 7th July, 1956. (Addition to 797399.) (797633.)

23290. Hilfiker, H., and Schreiber, A.—Electrical terminal connectors. 27th July, 1956. (797407.)

23303. Standard Telephones & Cables, Ltd.—Thermionic valve having compensation for fluctuations in heater supply voltage. 27th July, 1956. (797636.)

26100. Standard Telephones & Cables, Ltd.—Electric wave generators. 27th August, 1956. (797329.)

26232. Standard Telephones & Cables, Ltd.—Laminated sheeting. 28th August, 1956. (797480.)

27917. General Electric Co.—Constant-voltage d.c. circuits. 12th September, 1956. (797330.)

28759. Columbia-Southern Chemical Corporation.—Electrolytic cells. 20th September, 1956. (797482.)

31154. Philips Electrical Industries, Ltd.—Transistor voltage convertor. 12th October, 1956. (797332.)

34330. General Electric Co.—Liquid suspension of magnetic particles for inspection methods. 9th November, 1956. (797335.)

35240. Allmänna Svenska Elektriska Aktiebolaget.—Low temperature nuclear reactors. 19th November, 1956. (797485.)

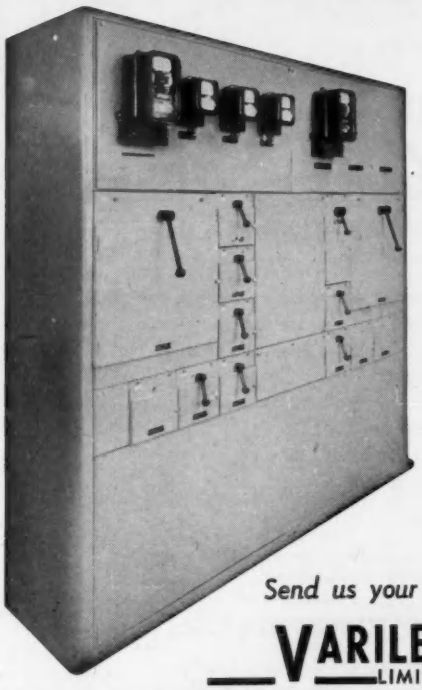
37947. Western Electric Co., Inc.—Transposed electrical conductors. 12th December, 1956. (797490.)

1957

4872. Allmanna Svenska Elektriska Aktiebolaget.—Transformer radiator. 13th February, 1957. (797491.)

25377. English Electric Co., Ltd.—Automatic programme control systems. 27th January, 1956. (Divided out of 797419.) (797420.)

Cubicle Switchboards



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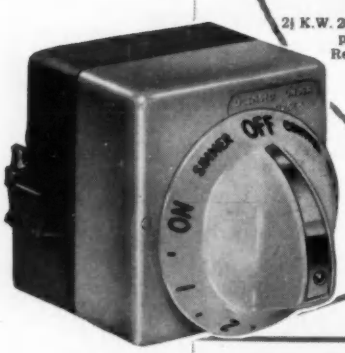

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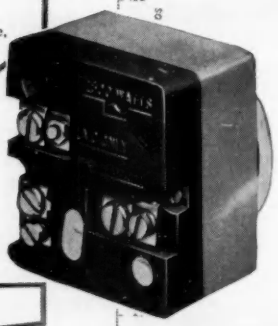

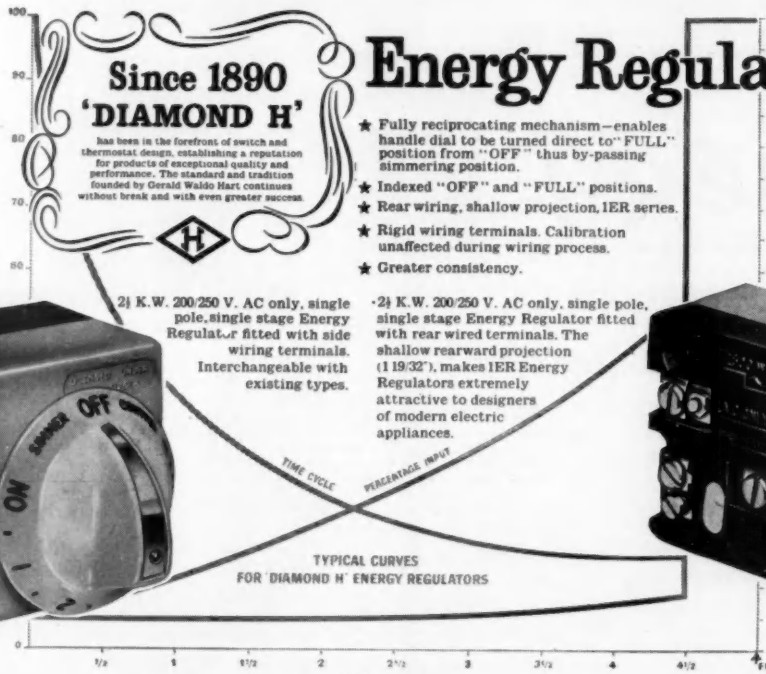

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CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Argentina.—Water and Electric Power Board. Electromechanical equipment for Cabra Corral hydro-electric power station. Closing date for tenders postponed to 24th September. (E.S.B. 6923/58. Ten/31489A.)*

Ashington (Northumberland). — U.D.C. Electrical installations in 38 houses north of the Green Lane housing estate. Surveyor, Council Offices, Ashington.

Australia.—Postmaster General's Department, Melbourne. 12th August. Switchboard cable. (E.S.B. 15244/58. Ten/33078.)*

Metropolitan Water, Sewerage and Drainage Board, Sydney. 5th August. Pumping plant, including motors. (E.S.B. 16088/58. Ten/33196.)*

N.S.W. Electricity Commission. 8th September. Ash and dust handling plant for Tallawarra power station. (E.S.B. 16096/58. Ten/33179.)*

Basildon.—U.D.C. 21st July. Street lighting equipment. (See this issue.)

Canada.—Manitoba Hydro-Electric Board. 23rd July. Supervisory control equipment for Parkdale terminal station. (E.S.B. 16092/58. Ten/33198.)*

Croydon.—Corporation. 11th July. Electrical work in pre-war houses. (See this issue.)

Durham.—County Council. 18th July. Miscellaneous equipment including electric lamps for the year ending 31st August, 1959. (See this issue.)

Essex.—County Council. 12th July. Renewal of electrical installation at Ogilvie School, Clacton. (See this issue.)

Ethiopia.—Addis Ababa Municipality. 22nd July. Two 35 kW generating sets. (E.S.B. 16012/58. Ten/33169.)*

Formosa.—Central Trust of China, Taipei. 22nd July. Star-delta starters. (E.S.B. 16086/58.I.C.A. Ten/33165.)*

India.—Director-General, India Store Department, London. 28th August. Annealing furnace. (See this issue.)

22nd July. Cables and cable jointing material and accessories. (E.S.B. 16193/58. Ten/33202.)*

Kerala State Electricity Board, Trivandrum. 110, 66 and 11 kV switchgear and ancillary equipment. Closing date for tenders postponed to 15th September. (E.S.B. 11580/58. Ten/32302B.)*

Iran.—Sabzevar Municipality. 1st September. Electrical materials. (E.S.B. 15988/58. Ten/33156.)*

Kenya.—Nairobi City Council. 11th August. Pumping sets and switchgear. (E.S.B. 16038/58. Ten/33180.)*

Manchester.—City Council. 28th July. Electrical installation work at Davyhulme sewage works extensions. (See this issue.)

New Zealand.—Wellington City Council. 28th July. H.v. switchgear. (E.S.B. 16162/58. Ten/33185.)*

Rhodesia and Nyasaland.—Salisbury City Council. 22nd July. L.v. circuit-breakers. (E.S.B. 15744/58. Ten/33092.)*

South Africa.—Union Tender and Supplies Board. 17th July. Telephone switchboard equipment. (E.S.B. 15901/58. Ten/33132.)* Floor polishers. (E.S.B. 15904/58. Ten/33184.)*

Stores Department, South African Railways. 11th July. Insulators. (E.S.B. 16378/58. Ten/33231.)* 18th July. Overhead equipment fittings. (E.S.B. 15406/58. Ten/33068.)*

Sunderland.—Corporation. Electrical installation in connection with additions to Sunderland Technical College. Borough architect, Grange House, Stockton Road.

Thailand.—Tobacco Monopoly. 15th July. Diesel-electric generating sets and switchgear. (E.S.B. 16130/58. Ten/33203.)*

Uruguay.—Administracion General de las Usinas Electricas y los Telefonos del Estada. Battery and charger. (E.S.B. 16087/58. Ten/33194.)*

Workington.—Corporation. 14th July. Street lighting installations. (See this issue.)

* Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

ORDERS PLACED

Basingstoke.—Corporation. Recommended. Supply and erection of 32 fluorescent street lighting units in Hackwood Road and Cliddesden Road (£3,565).—G.E.C.

Bath.—Education Committee. Recommended. Electrical installation at the new technical college (£14,714).—Central Electricity Co.

Bedford.—Highways and Sewerage Committee. Recommended. Street lighting installation, Bromham Road (£4,051).—A.E.I. Lamp & Lighting Co.

Glasgow. — British Railways (Scottish Region). Installation of colour-light signalling, Bowling to Helensburgh and Balloch, Glasgow suburban electrification.—Metropolitan-Vickers-G.R.S., Ltd.

Middlesbrough.—Education Committee. Electrical installations in two new high schools (£20,373).—A. Anderson & Son. Electrical installation at St. Patrick's Senior School (£878).—Trattles & Rushforth.

Newcastle-on-Tyne. — Regional Hospital Board. Electrical work at new hostel at Middlesbrough General Hospital (£1,314).—Edmundson Construction Co. Electrical work for new boiler plant at St. Luke's Hospital, Middlesbrough (£1,244).—Selborne Eng. Co.

Thornaby-on-Tees.—Corporation. Street lighting cable in Acklam Road, Middlesbrough (£1,017).—S. A. Inston & Co.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors

Accrington.—Works rebuilding; Howard & Bullough, Ltd., Fountain Street.

Barnehurst.—Ambulance station (£55,675); E. T. Ashley Smith, Kent county architect, Springfield, Maidstone.

Bedford.—Secondary modern school, Caves Lane; Robert Marriott, Ltd., builders, Midland Works, Rushden.

Billingham-on-Tees.—Houses (82); U.D.C. surveyor.

Birmingham.—Aged persons' home, Church Road, Yardley; J. F. Gregg, town clerk, Council House, 1.

Blackpool.—Two-storey business premises, Abingdon Street; Timothy Whites and Taylors, Ltd., Burley Hill, Leeds, 4.

Assembly hall, chapel, gymnasium and kitchen for Elmslie Girls' School, Clifton Street; F. Walsh, secretary.

Blyth.—Houses (80); D. W. Foster, borough engineer.

Brighton.—Flats and garages, Buckingham Place; Contemporary Homes, Ltd., 6, Surrey Street, London, W.C.2.

Bristol.—Showrooms and offices, Baldwin Street/Queen Charlotte Street corner site; Site Improvements, Ltd., 1, Queen Anne's Gate, London, S.W.1.

Bromley.—Houses (30), Elmstead Grange; Colin Gray & Co., surveyors, Hollington Galleries, High Street, Chislehurst.

Calne (Wilts).—Houses (20), Lickhill estate; Holbrow & Co., Ltd., Tetbury, Glos.

Cambridge.—Chemistry laboratories for University; Johnson & Bailey, Ltd., builders, 51, Norfolk Street.

Carlisle.—Additions to Carlisle and County High School (£44,000); Cartner & Sons, builders.

Houses (60), Morton estate; city engineer, 18, Fisher Street.

Motor showrooms, Lowther Street, for County Motors, Ltd.; J. Millar & Sons, builders, London Road.

Cheltenham.—Store, High Street; F. W. Woolworth & Co., Ltd., 26/40 Kensington High Street, London, W.8.

Chester.—Reconstruction of restaurant, café and ballroom for S. Reece & Son. Ltd., Northgate Street; Humphreys, Ltd., builders, 47, Whitefriars.

Chester-le-Street.—Office block, Vigo Lane, for British Oxygen Chemicals, Ltd., Chester-le-Street.

Colchester.—Houses (100), East Hill; H. Everett & Son, builders, 70, Barrack Street.

Dunstable.—Grammar school for girls, Langdale Road; Winton Hayes, Ltd., builders, Drove Road, Biggleswade.

Edinburgh.—Offices and supermarket, Leven Street (£52,000); St. Cuthbert's Co-operative Association, Ltd., 92, Fountainbridge, Edinburgh, 3.

Ellesmere Port.—Houses (204), bungalows (46), North Whitby estate; borough engineer, Queen Street.

Enfield.—St. Andrew's C.E. School, Churchbury Lane; J. Barrington-Baker, architect, 32, Queen Anne Street, London, W.1.

Eston.—New offices for U.D.C.; N. C. Harrison, surveyor, 246, Normanby Road, South Bank-on-Tees.

Exeter.—Reorganisation of kitchen and engineering services as part of long term scheme for the City Hospital (£670,000); Mid-Devon Hospitals Management Committee, 26, Queen Street, Exeter.

Hambledon.—Houses (28), Wonersh; R. J. Garland, clerk, Council Offices, Bury Fields, Guildford.

Huntingdonshire.—Private housing estates at Godmanchester, Ramsey, Hartford, Eaton Socon and Little Stukeley; Brundenell Developments, Ltd., Godmanchester, Hunts.

London.—Office block, 3/4, Conduit Street, Mayfair; Sir Robert McAlpine & Sons, Ltd., builders, 80, Park Lane, W.1.

Public laundry in Milton Grove, Stoke Newington (£59,000); borough engineer, Church Street, N.16.

Works extensions, South Norwood; Thomas & Evans, Ltd., Corona Works, Cumberlow Avenue.

Factory, Scrutton Street, E.C.; Messrs. Cluttons, 5, Great College Street, S.W.1.

Middlesbrough.—Rehabilitation centre and physiotherapy department at Middlesbrough

General Hospital for Newcastle Hospital Board (£40,000); P. H. Knighton, Board's chief architect, Benfield Road, Newcastle-on-Tyne.

Newcastle-on-Tyne.—Blocks of 12- or 15-storey flats, Heaton Park Road, Cruddas Park, and Shieldfield; city architect, 18, Cloth Market, Newcastle.

Houses (50); John Twiname, Ltd., builders, Cockermouth, Cumberland.

Northampton.—Houses (270), Parklands Road area; Acme Building Co., Ltd., South Bridge, and Chowns, Ltd., 63, Edinburgh Road.

Shrewsbury.—Works extensions; Salopian Industries, Ltd., Battleworks Road.

College of Further Education; Geo. Wimpey & Co., Ltd., builders, Chester Road, Castle Bromwich.

Scunthorpe.—Showrooms and flats, Ashby High Street and Bottesford Road; Ravenseft Properties, 129, Mount Street, London, W.1.

Seisdon.—Houses (100), off Wolverhampton Road, Codsall; surveyor, Rural Council Offices, Wombourn, near Wolverhampton.

Stevenage.—Houses (85), Longmeadow estate; F. J. Minns & Co., Ltd., builders, 67, St. Aldates, Oxford.

Sunderland.—New shop for Sunderland Forge & Engineering Co., Ltd., Pallion (£25,000); Brims & Co., Ltd., contractors, City Road, Newcastle-on-Tyne.

Houses (114), Whitehouse Road; L. W. Evans, Ltd., builders, 18, Norfolk Street.

Tiverton.—Houses (160), site near Cowley Moor estate; borough surveyor, St. Andrews Street.

Tottenham.—Works extensions; Dailley & Co., Ltd., Garman Road, N.17.

Wortley.—Houses (90), Burncross site, Chapeltown; A. Wikeley, surveyor, Council Offices, Grenoside, Sheffield.

HONG KONG'S ELECTRICAL TRADE

APART from being a small but expanding market for electrical goods, Hong Kong is of importance as a centre for trading with the mainland of China and with neighbouring Asian countries. In 1957 Hong Kong's electrical imports were £5·7 million (£4·3 million in 1956) and her exports £2·2 million (£2·1 million in 1956). The United Kingdom, with imports valued at £3·3 million (£2·7 million in 1956), continued to be the Colony's principal supplier of electrical goods. As can be seen from the accompanying tables, the provision of the larger items of plant, such as generators, transformers, switchgear and cables, used by the Colony's two supply companies, is largely the preserve of the British electrical industry, but for other goods competition, principally from Japan, Western Germany, the United States and Holland, is strong and increasing. Radio, telecommunications equipment and cables account for the bulk of Hong Kong's imports, while torch batteries and bulbs are the main exports. Due to the growth of local manufacture there is a certain power shortage, which is expected to increase. Future trade prospects seem likely to be hampered by a lack of funds and a tendency to overstock. (1 H.K. $= 1s 6d.)

Table 1.—Hong Kong's Electrical Imports and Exports in 1957 (H.K. $000)

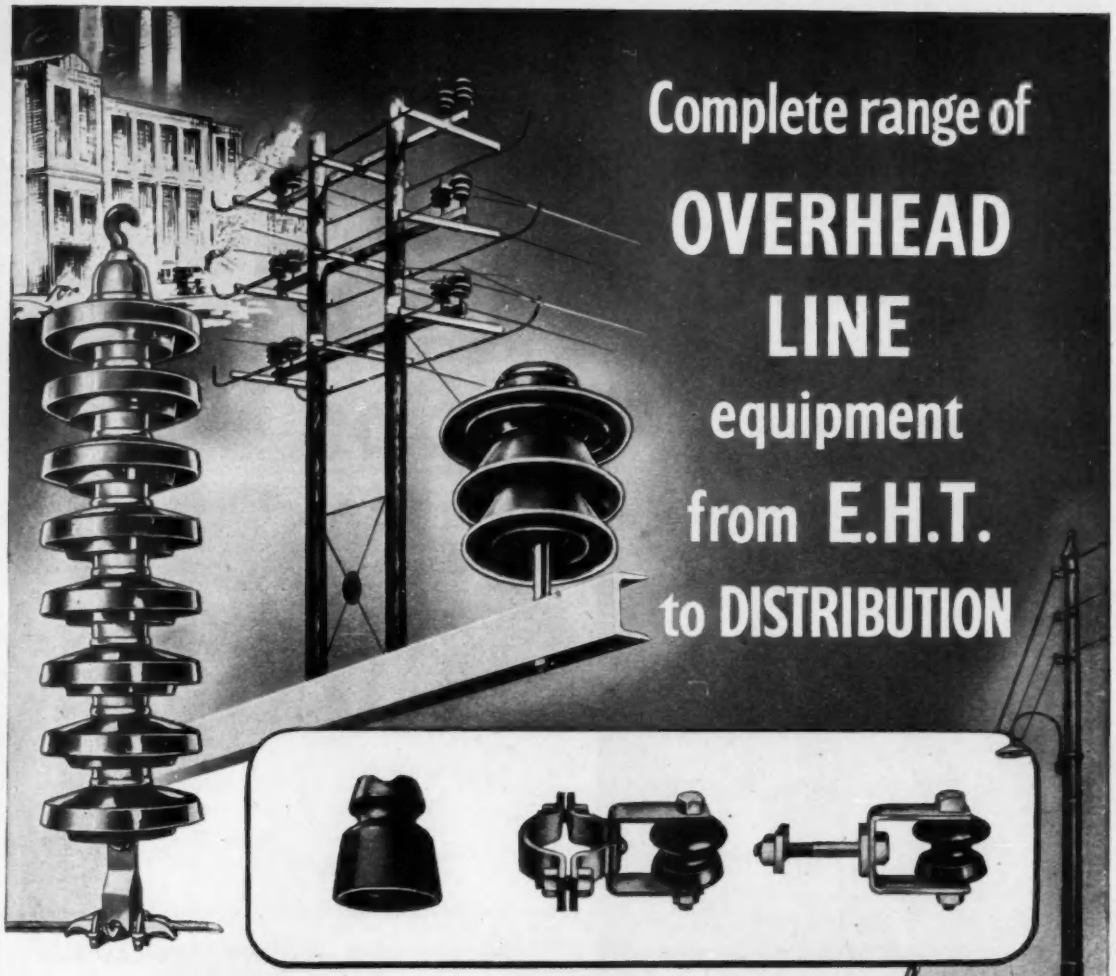
Country	Imports	Exports
United Kingdom	55,398	2,943
South Africa	—	278
Canada	252	590
Borneo	56	324
Ceylon	—	488
India	42	791
Pakistan	—	759
Malaya	432	3,268
Australia	563	256
Belgian Congo	—	218
United States	7,015	5,719
Cuba	—	402
Central America	—	287
Burma	—	968
Cambodia	—	1,585
China (excl. Formosa)	2,327	1,801
Formosa (Taiwan)	91	1,544
Indonesia	—	1,102
Japan	10,571	93
South Korea	—	259
Laos	—	2,413
Macao	102	1,397
Philippines	—	256
Thailand	11	3,643
Middle & Near East Countries	—	1,729
Denmark	204	169
West Germany	10,949	—
Italy	777	73
Holland	4,612	56
Sweden	401	216
Switzerland	5,490	11

Table 2.—Hong Kong's Electrical Imports, 1957 (H.K. $000)

Product	Value
Generators & alternators, up to 100 kVA	1,110
United Kingdom	475
Japan	401
Ditto, above 100 kVA	1,989
United Kingdom	1,983
Motors, up to ¾ h.p.	2,246
United Kingdom	854
United States	292
West Germany	842
Ditto, 1–50 h.p.	2,441
United Kingdom	752
West Germany	1,145
Sweden	237
Ditto, above 50 h.p.	420
United Kingdom	324
West Germany	94
Transformers, up to 100 kVA	235
United Kingdom	163
United States	53
Ditto, above 100 kVA	1,866
United Kingdom	1,843
Switchgear, convertors and rectifiers	5,577
United Kingdom	5,274
West Germany	217
Torch batteries	1,955
United States	731
China	1,140
Other batteries	857
Japan	694
Filament lamps	2,882
United Kingdom	571
Holland	1,319
Ditto, other	1,108
United States	624
Domestic radio receivers, including radiograms	11,114
United Kingdom	533
United States	415
China	244
Japan	3,779
West Germany	3,629
Holland	2,397
Apparatus for controlling, measuring and signalling	3,151
United Kingdom	2,683
Radio apparatus n.e.s. for telegraphy, telephony, TV and radar	10,267
United Kingdom	7,142
United States	1,130
Japan	770
Telephone and telegraph apparatus other than radio	5,239
United Kingdom	4,947
Australia	91
Electronic apparatus including domestic appliances	3,554
United Kingdom	1,806
France	966
Electrical appliances for motor vehicles, aircraft, ships and cycles	1,260
United Kingdom	396
Canada	80
West Germany	600
Electro-medical apparatus	1,008
United Kingdom	390
United States	205
West Germany	242
Holland	112
Portable tools and domestic appliances	7,464
United Kingdom	2,202
United States	1,587
China	364
Japan	2,299
Insulated cables	12,031
United Kingdom	11,842
Japan	92
Insulated wire	5,505
United Kingdom	3,976
Japan	840
Electrical machinery, apparatus and appliances n.e.s.	16,096
United Kingdom	7,008
Australia	376
United States	1,071
China	194
Japan	526
West Germany	1,336
Italy	240
Switzerland	5,125

Table 3.—Hong Kong's Electrical Exports, 1957 (H.K. $000)

Product	Value
Generators and alternators	437
China	160
Formosa	61
Indonesia	99
Motors, up to ¾ h.p.	96
Formosa	25
Macao	22
Ditto, 1–50 h.p.	94
China	23
Indonesia	26
Transformers	949
Venezuela	274
Burma	165
Indonesia	161
Switchgear, convertors and rectifiers	58
China	42
Torch batteries (re-exported)	1,424
Laos	906
Thailand	255
Ditto (locally manufactured)	11,005
Canada	425
Malaya	1,675
Pakistan	491
United States	2,776
Thailand	1,445
Ditto, other than torch batteries	901
Torch bulbs	4,254
United Kingdom	670
India	628
United States	609
Electronic apparatus, including domestic appliances	135
Filament lamps	1,730
United Kingdom	916
Thailand	433
Other lamps	216
Domestic radio receivers	2,338
Cambodia	760
Formosa	620
Apparatus for wireless telephony and telegraphy	1,176
Formosa	459
China	262
Electrical appliances for vehicles, aircraft, ships, cycles and i/c motors	2,940
United Kingdom	564
United States	1,155
China	267
Measuring, control and signalling apparatus	396
China	234
Electro-medical apparatus	349
China	326
Portable tools and domestic appliances	1,227
United Kingdom	272
Macao	240
Insulated cables and domestic wire	1,154
Electrical machinery, apparatus and appliances n.e.s.	6,196
United Kingdom	514
Malaya	978
United States	1,132
China	353
Thailand	596



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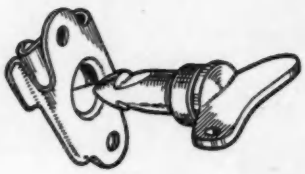

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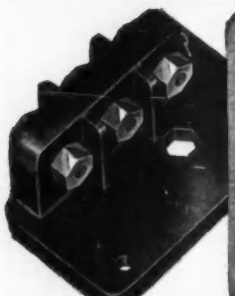

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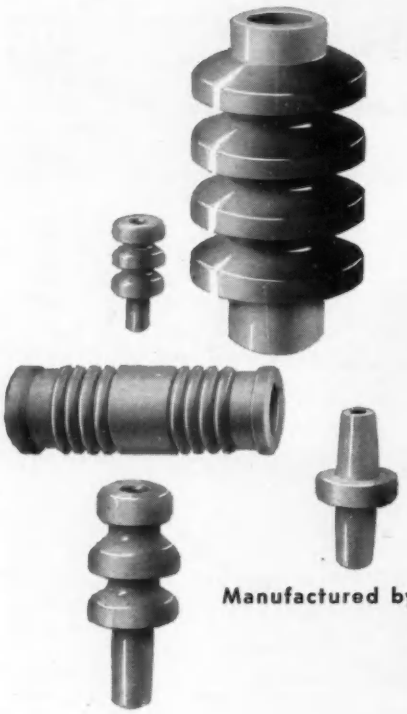

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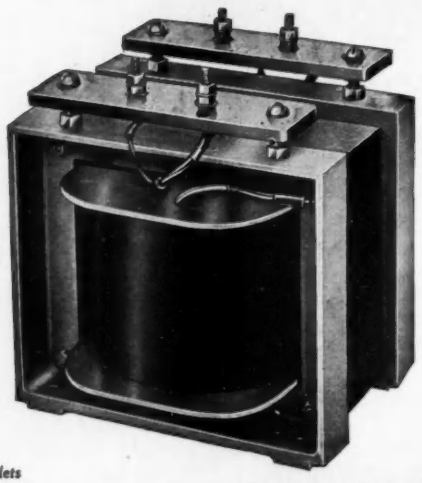

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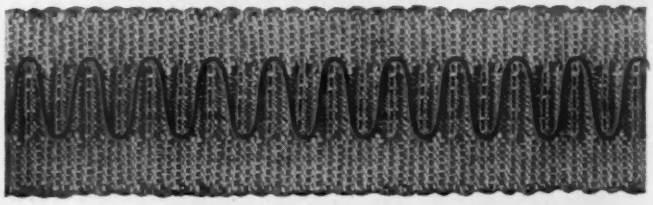

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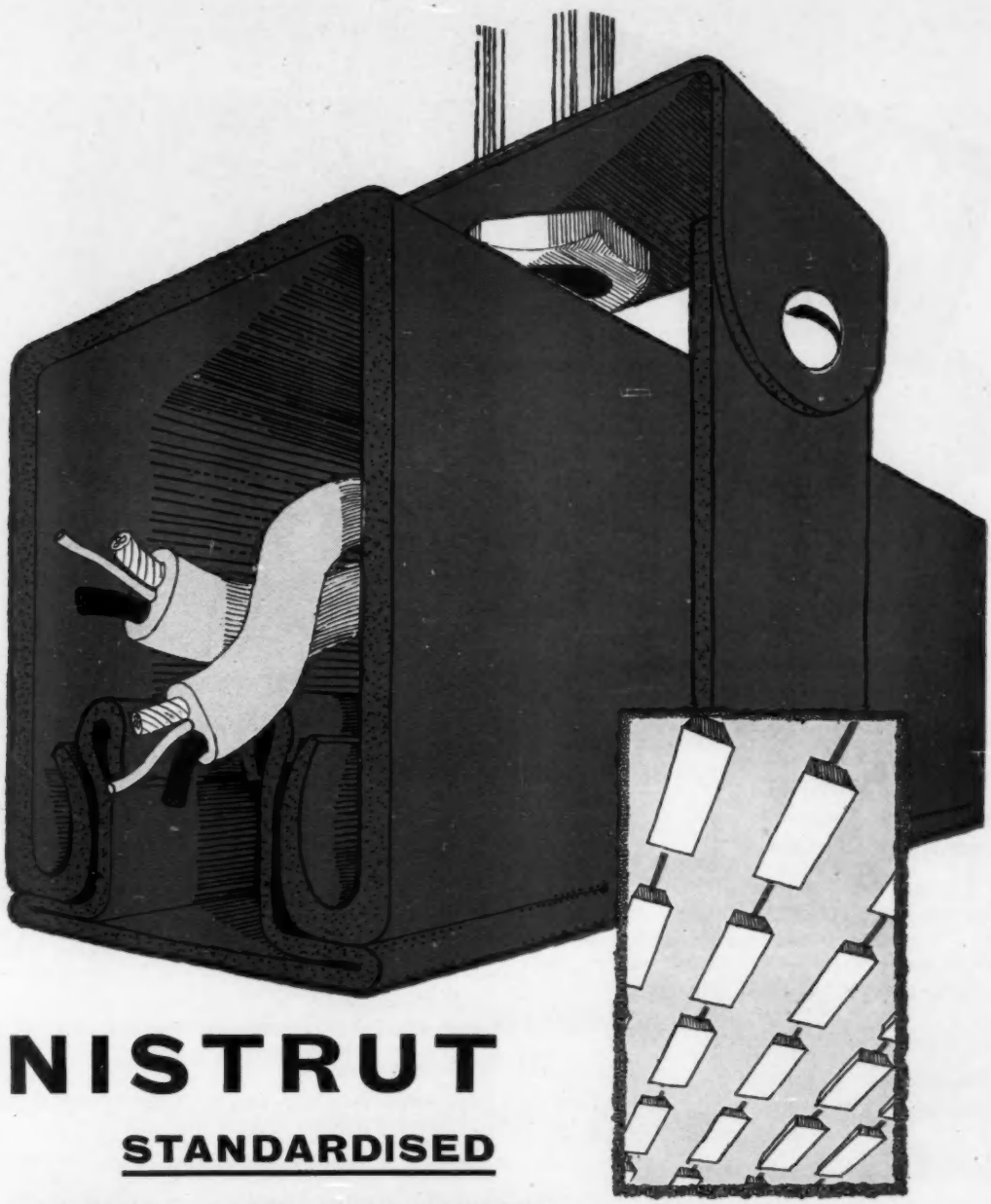

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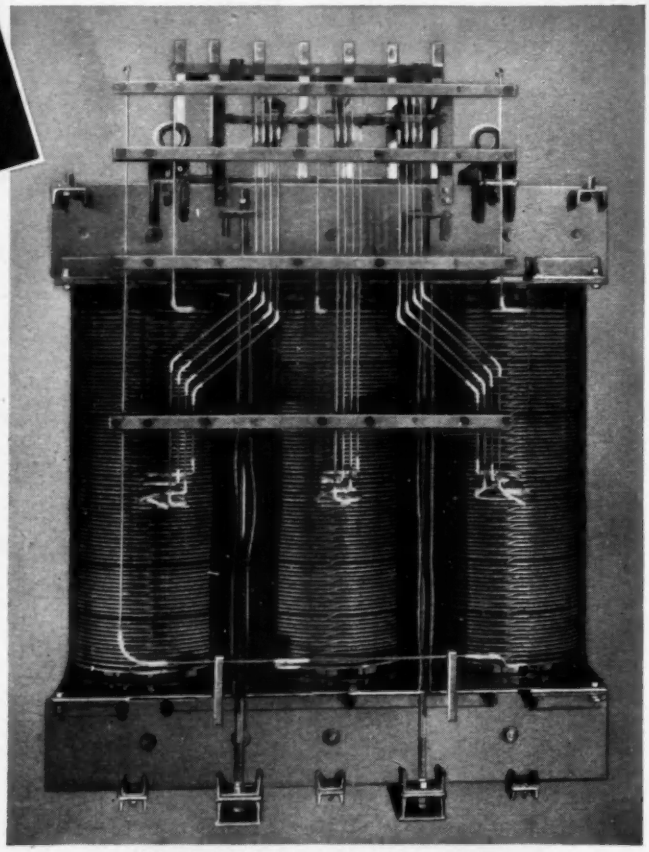

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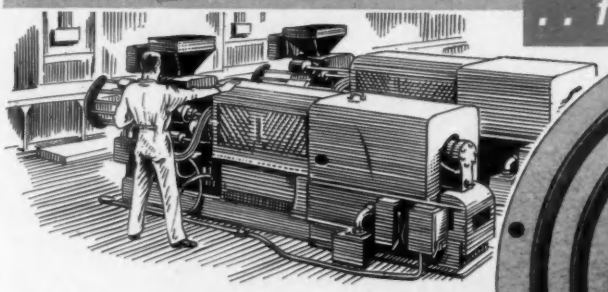

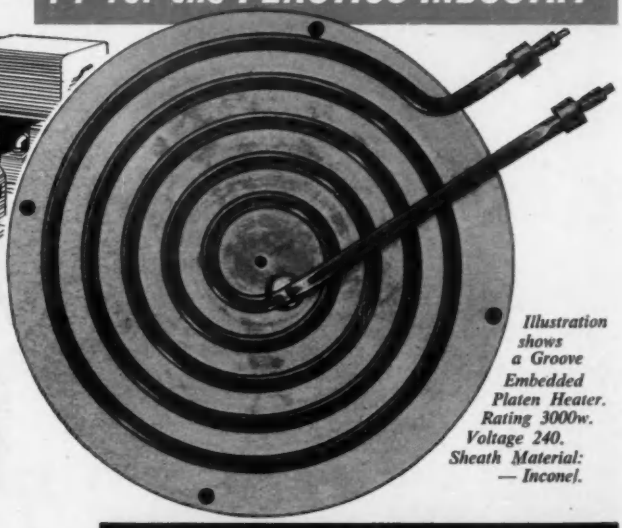

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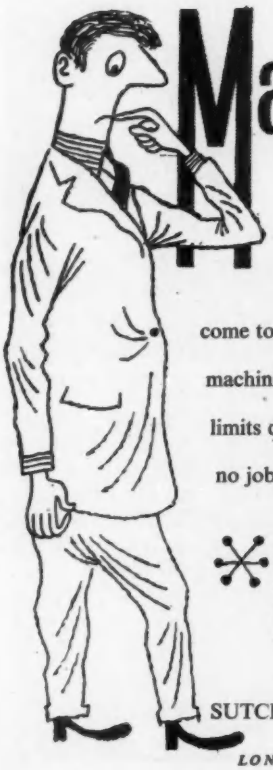

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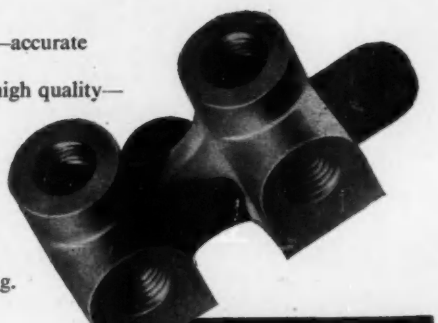

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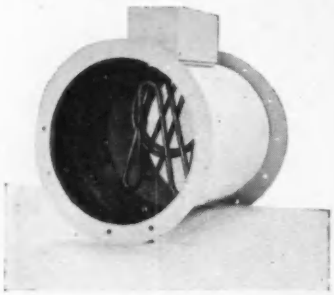

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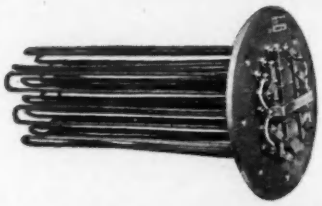

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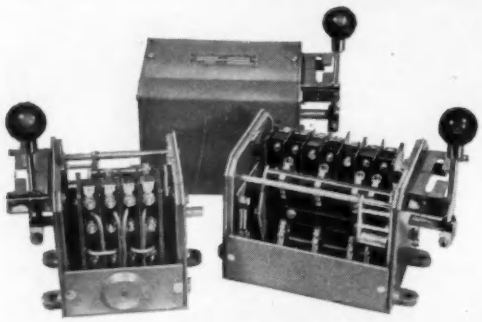

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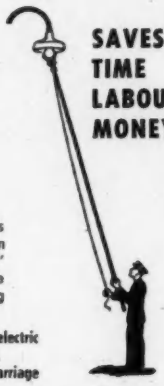

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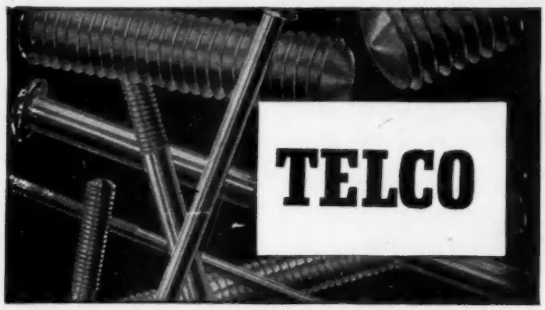

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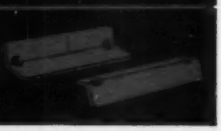

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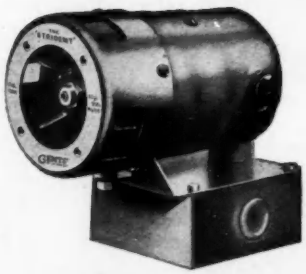

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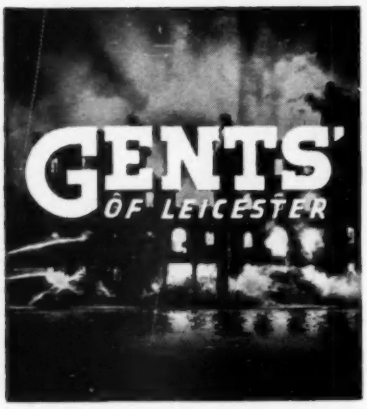

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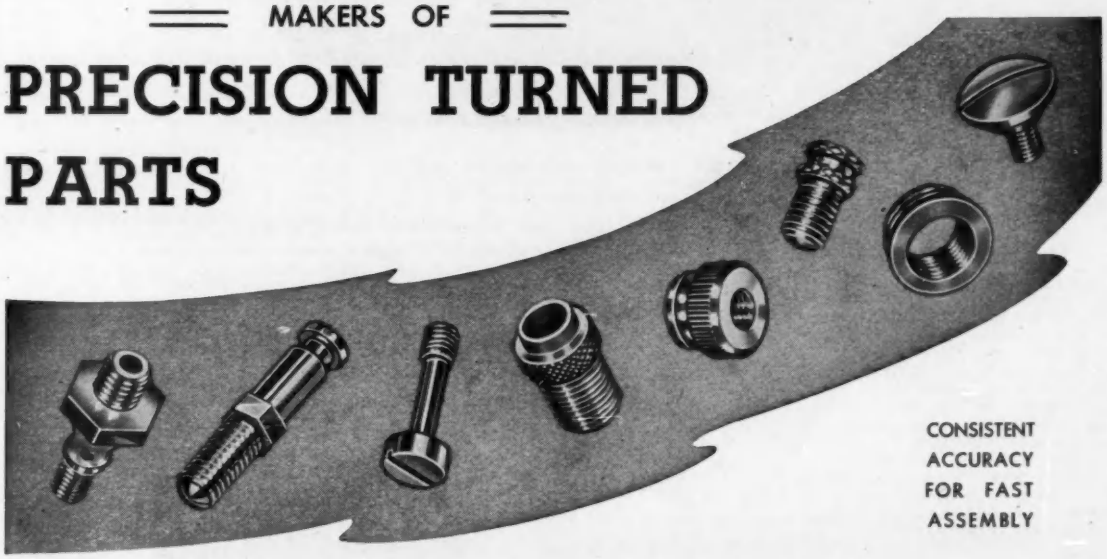

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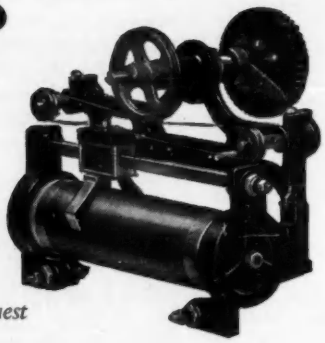

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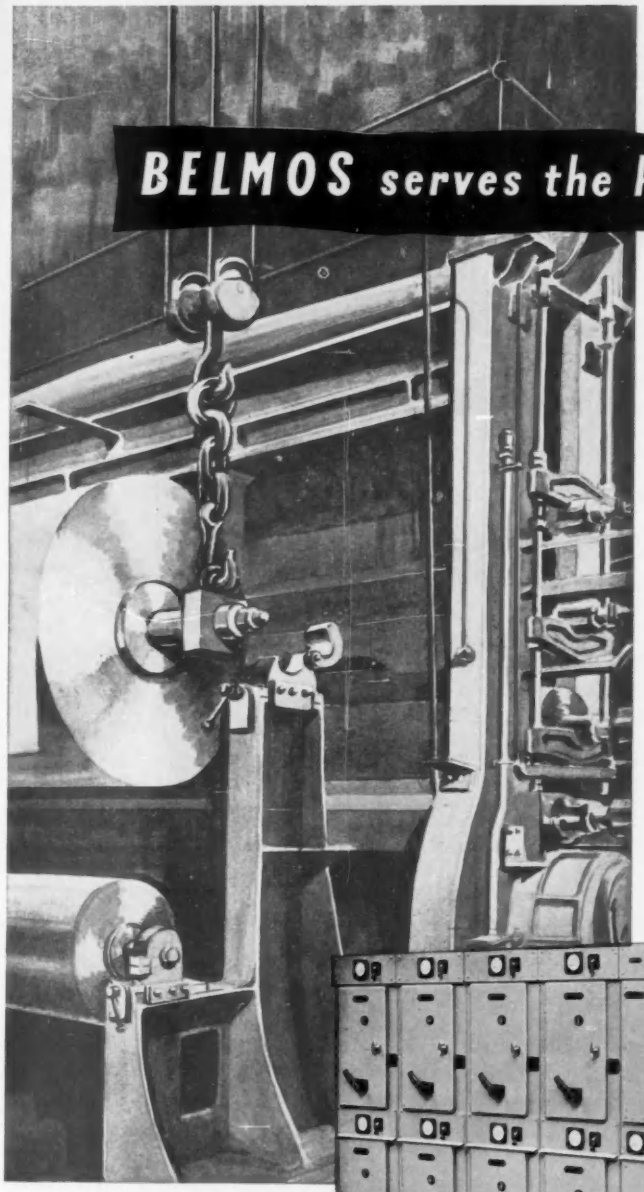

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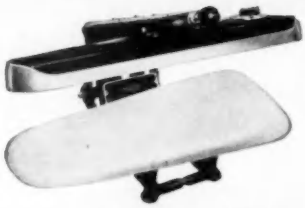

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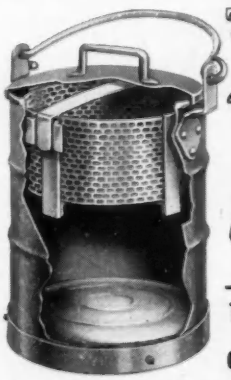

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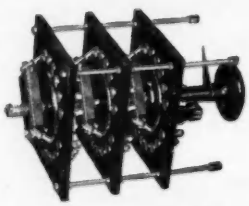

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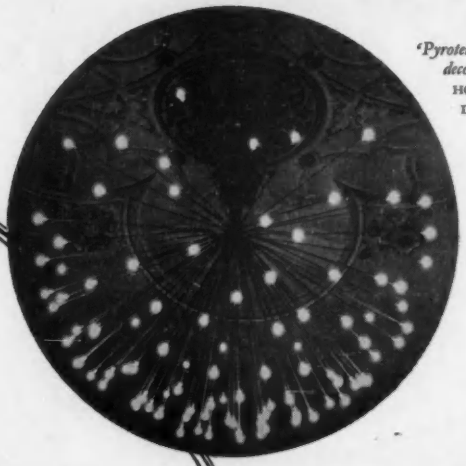

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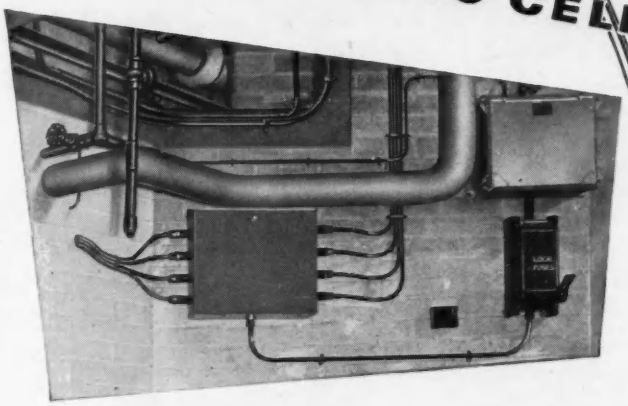

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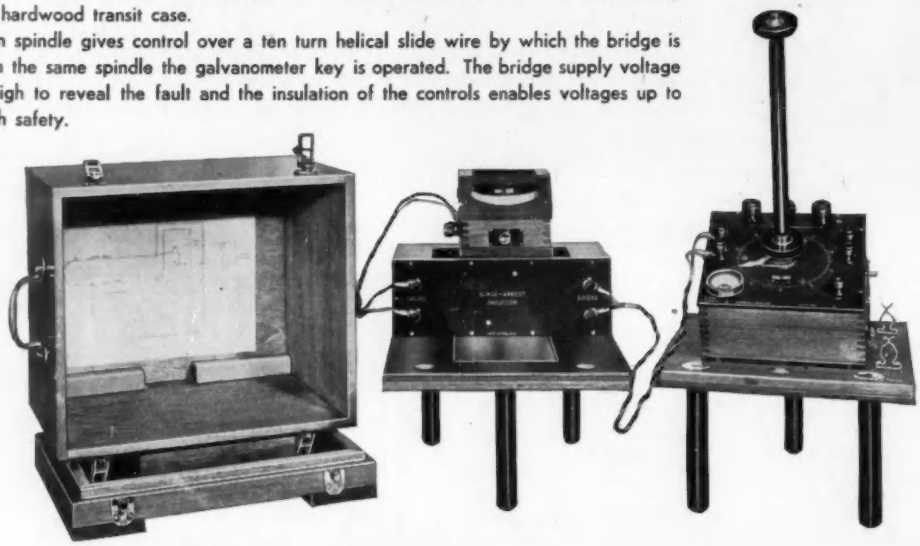

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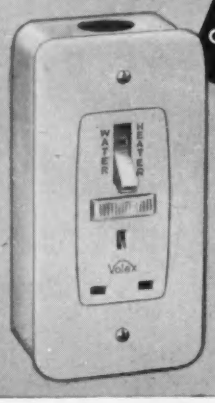

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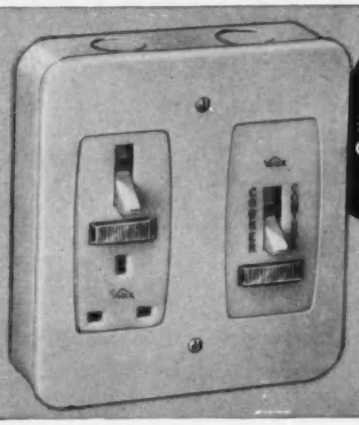

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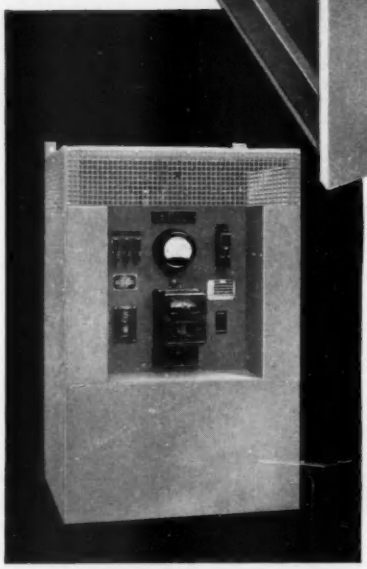

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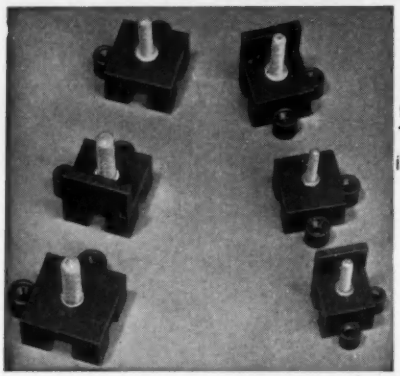

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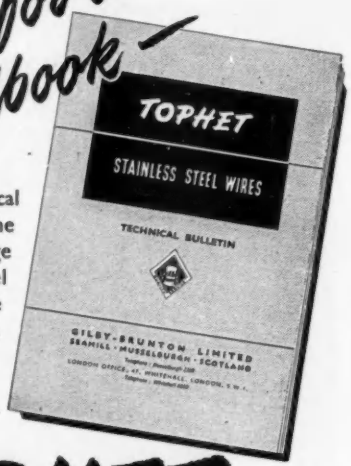

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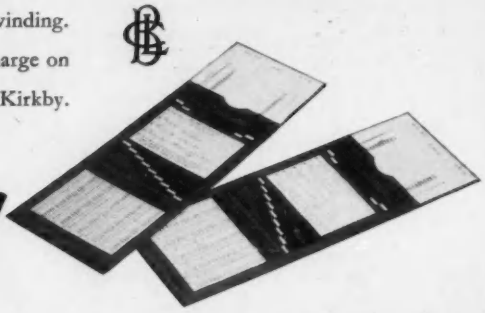

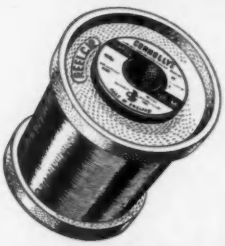

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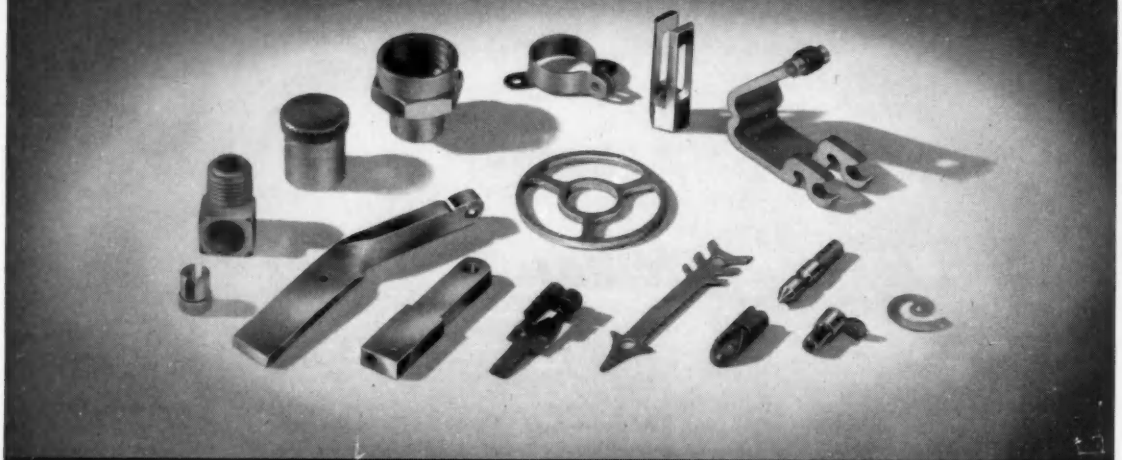

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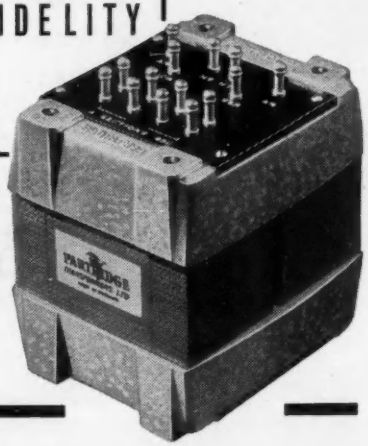

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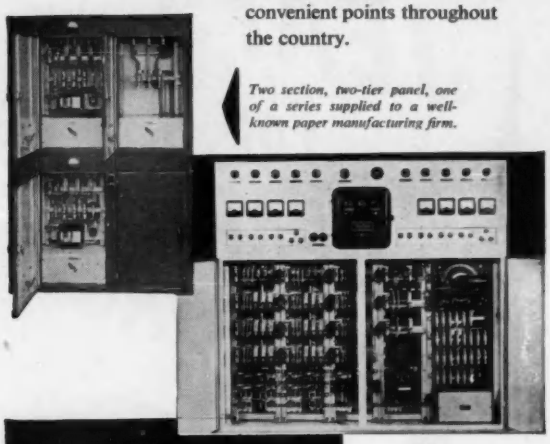

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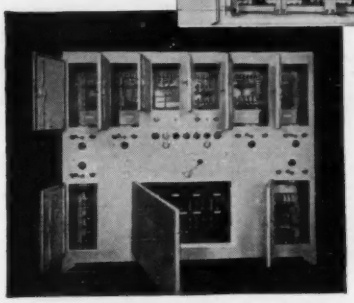

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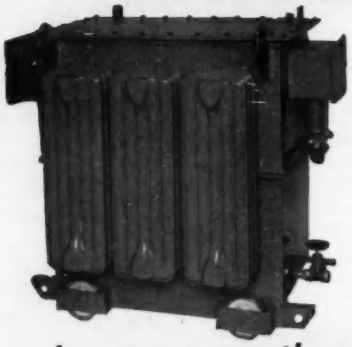

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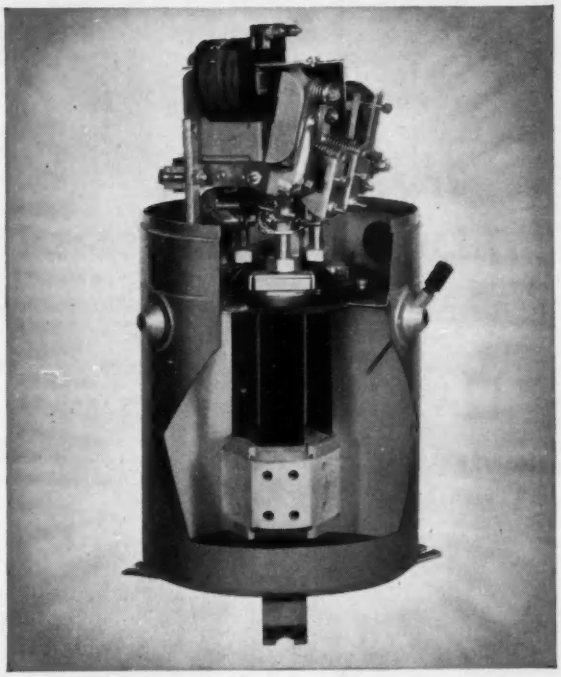

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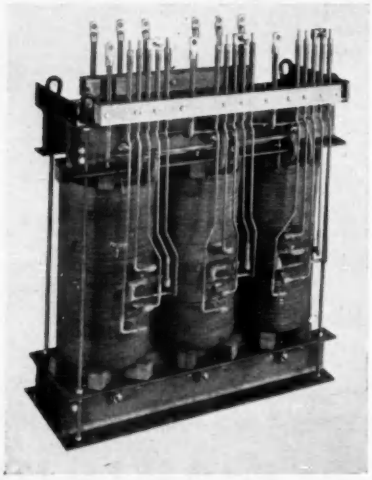

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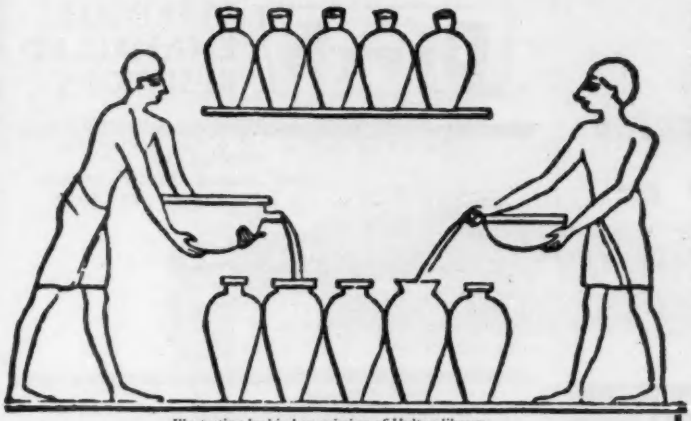

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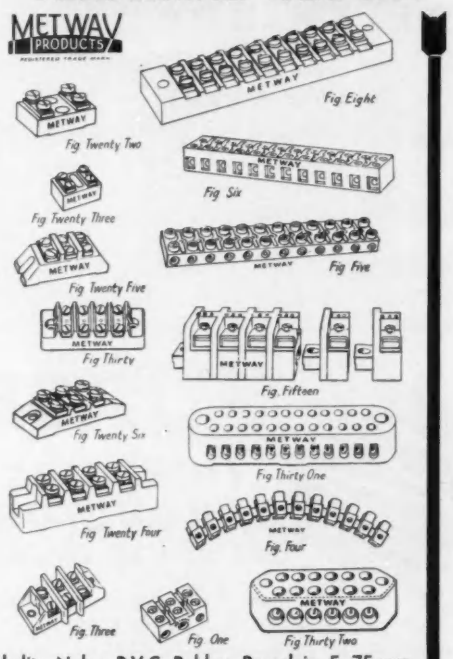

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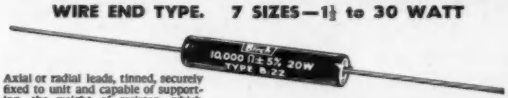

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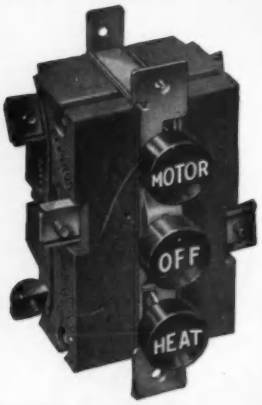

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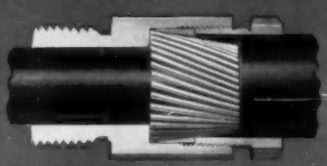

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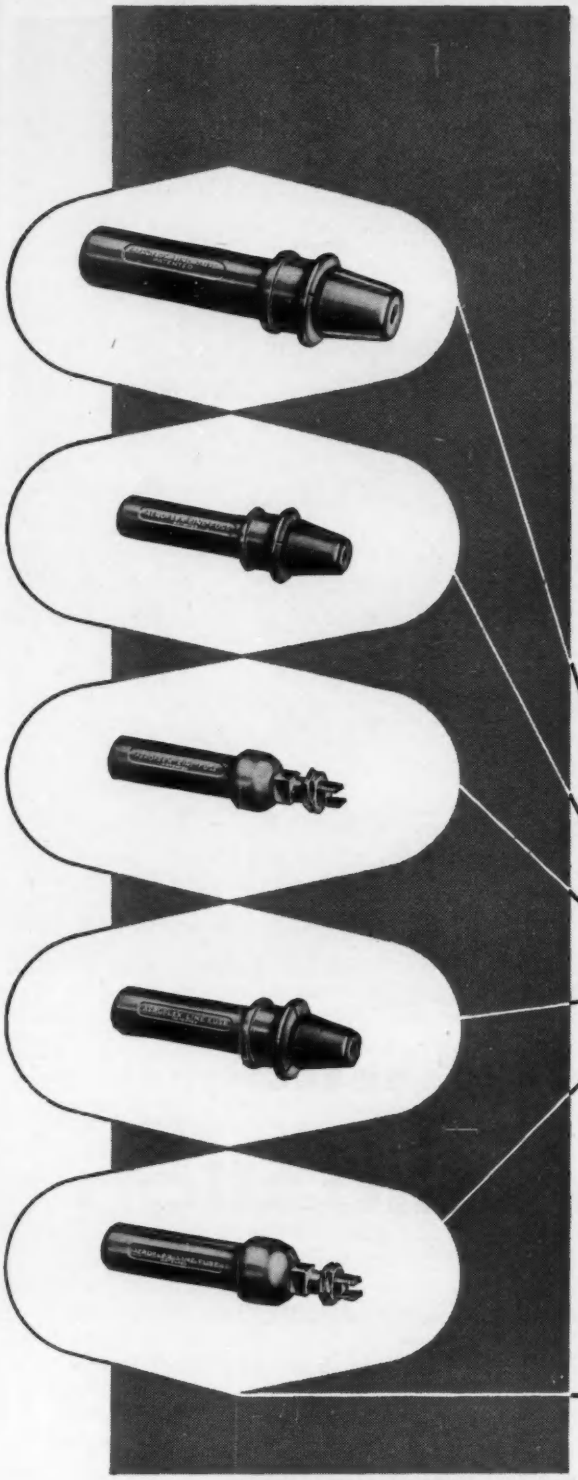

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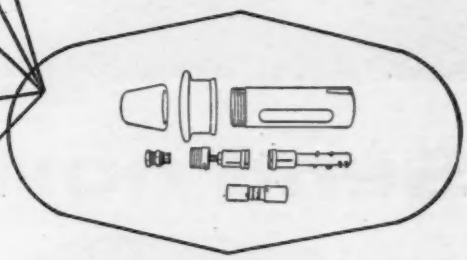

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OFFICIAL NOTICES, TENDERS, ETC.

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Ogilvie School, Holland Road, Clacton-on-Sea

Renewal of Electrical Installation

THE Education Committee of the County Council of Essex invites Contractors who have a sufficient labour force and workshops and are willing to submit a firm price tender for the above contract to forward their names.

The work consists of the renewal of the electrical installation, estimated at £4,000.

Contractors will be required to use as much existing material as possible. The building will remain in occupation and the contract includes incidental builder's work.

From the names submitted a panel of contractors will be chosen, who will subsequently be provided with specifications.

Contractors' applications should be sent to reach the undersigned not later than Saturday, 12th July, 1958.

H. CONOLLY, C.B.E., F.R.I.B.A.,
County Hall, County Architect.
Chelmsford. 4034

URBAN DISTRICT COUNCIL OF BASILDON

Public Lighting

TENDERS invited for the supply, delivery and erection of:—

(a) 78 Class A Sodium Discharge Lamps on concrete columns in Laindon Road, Billericay; London Road, Pitsea, and Nevendon Road, Wickford.

(b) 18 Class B Tungsten Lamps on concrete columns at Hickstars Lane and Bell Hill Housing Sites, Billericay.

Tender documents obtainable from Engineer and Surveyor, 108, High Street, Billericay, Essex.

Tenders must be returned to Clerk of the Council, 98, High Street, Billericay, by noon, 21st July. 4013

BOROUGH OF WORKINGTON

The Supply and Erection of Street Lighting Equipment in John Street, Harrington Road, Vulcans Lane and Stainburn Road, Workington

TENDERS are invited for the supply and erection of 47 Concrete Street Lighting Columns complete with 140-watt Sodium Lamps and Lanterns in the above-mentioned streets.

Specifications, etc., are obtainable from the Borough Engineer, Stoneleigh, Park End Road, Workington, and are to be deposited with the undersigned in the envelopes provided not later than 12 noon on Monday, 14th July, 1958.

The Corporation do not bind themselves to accept the lowest or any other tender.

RUSSELL C. PHARAOH,
Town Clerk.
3rd July, 1958. 4025

CITY OF MANCHESTER

Davyhulme Sewage Works Extensions, Stage IA

TENDERS invited for supply, delivery, erection and laying of POWER, CONTROL and INDICATION ELECTRIC CABLES. Tender documents from City Surveyor, Town Hall, Manchester, 2, on payment of deposit of £5 5s., returnable on receipt of a bona fide tender.

Tenders returnable by 28th July, 1958. 4035

INDIA STORE DEPARTMENT

THE Director-General, India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3, invites tenders for the supply of the following:—

One Electric Bogie Type Annealing Furnace, 36 feet drop, width 10 feet, height 4 feet 6 ins., complete with haulage electrical gear, etc.

Forms of tender, which are returnable by Thursday, 28th August, 1958, may be purchased at the above address at a cost of 10s.

In your application for tender please quote reference 2006/58 EM/ENG.1. 3998

COUNTY BOROUGH OF CROYDON

To Electrical Contractors

TENDERS are invited for installing Power Plug Sockets and other electrical work in pre-war Council Houses.

Particulars from Housing Manager, 71, Park Lane, on payment of one guinea, which will be returned on receipt of a bona fide tender.

Tenders must reach me by 12 noon on 11th July, 1958.

E. TABERNER,
Town Clerk. 4032

COUNTY COUNCIL OF DURHAM

TENDERS invited for supplying light equipment—kitchen utensils, cutlery, pottery, glassware and plastics, turnery, textiles, hollowware, brushes, electric lamps and miscellaneous items—for year ending 31st August, 1959.

Forms of tender, returnable by 18th July, 1958, from undersigned.

G. H. METCALFE,
Shire Hall, Director of Education.
Durham.
23rd June, 1958. 3999

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COUNTY COUNCIL OF ESSEX

REQUIRED on the established staff:—

(a) Two ASSISTANT HEATING ENGINEERS in Special Grade, salary not exceeding £1,030. Candidates preferably should be Associate Members of I.H. and V.E.

(b) One ASSISTANT HEATING ENGINEER, A.P.T.D. II, salary not exceeding £845.

(c) One ASSISTANT ELECTRICAL ENGINEER in Special Grade, salary not exceeding £1,030. Candidates preferably should be Associate Members of the I.E.E.

(d) One ASSISTANT ELECTRICAL ENGINEER, A.P.T.D. I, salary not exceeding £725.

Commencing salary in each case according to qualifications and experience.

Candidates for appointments (a) should be capable of designing schemes, preparing drawings and specifications for hot water heating, h. and c. water supplies; for (b) similar duties under supervision; (for (c) should be capable of designing schemes, preparing drawings and specifications for electric lighting, heating and power installations; and for (d) similar duties under supervision.

Application form from H. Conolly, C.B.E., F.R.I.B.A., County Architect, County Hall, Chelmsford (state post for which form is required), to be returned with copies of three testimonials by 18th July, 1958.

Canvassing disqualifies. 4000

SOUTH OF SCOTLAND ELECTRICITY BOARD

Kincardine Generating Station

APPLICATIONS are invited for the undernoted superannuable appointments.

The station, at present under construction, is situated on the Firth of Forth in Central Scotland, and will consist of 3 120-MW units followed by 2 200-MW units, giving an ultimate capacity of 760 MW. The units will be coal fired with re-heat, having steam conditions of 1,500 p.s.i., 1,000° F. for the 120-MW units and 2,350 p.s.i., 1,050° F. for the 200-MW units.

Candidates for posts (1), (2) and (3) should possess technical qualifications of not less than Higher National Certificate standard and, preferably, be members of one of the senior engineering institutions. Candidates for post (4) should, preferably, possess qualifications leading to Associateship of the Royal Institution of Chemistry.

Arrangements are being made to provide housing accommodation for the successful applicants.

(1) OPERATION AND EFFICIENCY ENGINEER (Ref. K3).

Applicants should have had considerable operating experience in modern power stations. The successful candidate will be responsible for the efficient operation of all the station plant and for the control of the operating staff.

Salary N.J.B. Class K, Grade 5, £1,325/£1,415 per annum, rising ultimately to Class M, Grade 5, £1,560/£1,665 per annum.

(2) MAINTENANCE SUPERINTENDENT (Ref. K4).

Applicants should have had considerable experience in the maintenance of modern turbo-alternators and steam generating plant and be acquainted with modern repair techniques. Preference will be given to candidates with operational experience in a large modern power station. The successful applicant will be responsible for the repair and maintenance of all mechanical and electrical station plant.

Salary N.J.B. Class K, Grade 5, £1,325/£1,415 per annum, rising ultimately to Class M, Grade 5, £1,560/£1,665 per annum.

(3) ASSISTANT MAINTENANCE ENGINEER (Instruments) (Ref. K5).

Applicants should have had considerable experience in instrument work and should be familiar with one or more systems of automatic boiler control. Preference will be given to candidates with power station experience. The successful applicant will be responsible for the efficient operation, repair and maintenance of all instruments and all automatic control gear associated with turbo-alternators, boilers and ancillary plant.

Salary N.J.B. Class K, Grade 8, £1,065/£1,140 per annum, rising ultimately to Class M, Grade 8, £1,235/£1,325 per annum.

(4) STATION CHEMIST (Ref. K6).

Applicants should have had experience, in a modern power station, of feedwater treatment, fuel testing and associated processes.

Salary N.J.B. Class K, Grade 7, £1,160/£1,235 per annum, rising ultimately to Class M, Grade 7, £1,325/£1,415 per annum.

Applications, on the standard form and quoting appropriate reference number, should be submitted to the Secretary, South of Scotland Electricity Board, 168, Broomhill Drive, Glasgow, W.1, not later than 22nd July, 1958. 4059

Situations Vacant (continued)

SOUTHERN ELECTRICITY BOARD

Principal Assistant, Internal Audit

Chief Accountant's Department at Southern Electricity House, Littlewick Green, Maidenhead. Salary N.J.C. Grade 10 (£1,425-£1,545 per annum). N.J.C. conditions of service.

Applicants should be qualified accountants who have had a wide experience of audit work, preferably in the electricity supply industry. The successful applicant will be based at the Board's headquarters at Maidenhead but will be required to operate throughout their area.

Applications on forms obtainable from the Secretary, Southern Electricity House, Littlewick Green, Maidenhead, not later than 15th July, 1958, quoting reference Z.923.

Assistant Engineer (Local)

Swindon District of No. 2 (Newbury) Sub-Area, located at Cirencester. Salary N.J.B. Class F, Grade 11 (£685-£730 per annum). N.J.B. conditions of service.

Applicants should have experience in the design, construction, operation and maintenance of H.V. and L.V. overhead and underground distribution systems, substation plant and distribution equipment, and possess suitable technical qualifications. The appointment will involve standby duties.

Applications on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury, Berks, and returned to him, quoting Z.848, not later than 15th July, 1958.

General Assistant Engineer

Swindon District of No. 2 (Newbury) Sub-Area. Salary N.J.B. Class F, Grade 13 (£590-£635 per annum). N.J.B. conditions of service.

The duties of the post will be to assist with distribution, including minor construction work and general maintenance of H.V. and L.V. overhead and underground distribution systems, substation plant, etc. This appointment may involve standby duties. Applicants should possess suitable technical qualifications.

Applications on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury, Berks, and returned to him, quoting Z.921, not later than 15th July, 1958.

The successful candidates for the above appointments will be required to contribute to the Electricity Supply (Staff) superannuation scheme, if eligible. 4048

JOSEPH LUCAS (ELECTRICAL) LIMITED

ASSISTANT ELECTRICAL DESIGN ENGINEER

required for the design of rotating electrical machines and electro-magnetic devices. Projects will include fundamental design investigations, and full scope will be given for initiative and imagination.

The post is permanent and pensionable.

Apply in writing stating age, qualifications and experience to the Personnel Manager, Joseph Lucas (Electrical) Limited, Great King Street, Birmingham, 19, quoting reference PM/D/221.

125

THE INTERNATIONAL SYNTHETIC RUBBER CO. LTD.

Shift Electricians

THE I.S.R. Co. Ltd. will shortly be requiring SHIFT ELECTRICIANS for their new Chemical Plant at Hythe. Applicants should preferably have had experience in the chemical industry. These posts offer secure employment and excellent sickness payment and superannuation schemes. A subsistence allowance will be paid and housing will become available.

Applications should be addressed to the Labour Officer of the Company at Hythe, Hants. 4056

CENTRAL ELECTRICITY GENERATING BOARD

East Midlands Division

APPLICATIONS are invited for the following appointments in this Division :—

STATION CLERK,
HIGH MARNHAM POWER STATION
(Vacancy No. 102/58/ER).

Applicants should have had experience in the clerical and administrative work of a power station, including stores accounting, calculation and payment of wages and work in connection with suppliers' accounts.

The salary will be in accordance with Grade 5 (£855-£930 per annum) of the National Joint Council Agreement.

Closing date for receipt of applications, 9th July, 1958.

SECOND ASSISTANT CHEMIST,
DERBY POWER STATION
(Vacancy No. 101/58/ER).

Candidates should preferably hold the Higher National Certificate in Chemistry and should have had some previous experience in a power station laboratory. They should be familiar with the methods of sampling and analysis of coal, water and oil, and with the interpretation and application of the analytical results.

Salary will be in accordance with Class F, Grade 11 (£685 - £730 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 9th July, 1958.

SENIOR DRAUGHTSMAN (Mechanical),
GENERATION (Construction) DEPT.,
DIVISIONAL HEADQUARTERS.
(Vacancy No. 100/58/ER).

Candidates should have experience on one or more of the following :—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant and general station auxiliaries.

(ii) H.P. and L.P. steam and feed pipework. Condensing plant and feed heating systems.

(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary will be in accordance with Grade 5 (£760 - £860 per annum) or Grade 4 (£895-£995 per annum) of Schedule D of the National Joint Board Agreement.

Closing date for receipt of applications, 9th July, 1958.

GENERAL ASSISTANT ENGINEER
(Planning Office),
CASTLE DONINGTON
POWER STATION
(Vacancy No. 103/58/ER).

Applicants should have had practical experience of power station maintenance, and be capable of compiling records and reports and controlling plant spares.

Salary will be within Class L, Grades 17/15 (£635-£785 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 16th July, 1958.

These appointments will be pensionable under the terms of the Electricity Supply (Staff) Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Divisional Establishments Officer, Central Electricity Generating Board, East Midlands Division, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. PLEASE QUOTE VACANCY NUMBER.

L. F. JEFFREY,
Divisional Controller.

26th June, 1958. 4026

NORTHAMPTON COLLEGE OF ADVANCED TECHNOLOGY

St. John Street, London, E.C.1

GRADES I, II and III LABORATORY TECHNICIANS required in Electrical Engineering Department. In addition to holidays with pay totalling up to five weeks per year, part-time day release is granted for studies in approved National Certificate or Degree courses. Standard L.C.C. conditions. Salary scales (from £245 to £815 p.a. according to age and qualifications) and superannuation.

Letters of application to Head of Electrical Engineering Department. 4014

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:—

Central Gloucestershire Sub-Area

THIRD ASSISTANT ENGINEER (Control) (Headquarters).

The successful applicant will be required to take charge of control operations of 11-kV, 33-kV and 66-kV systems on shift rota. Technical qualifications desirable. Salary £885/£930 per annum (N.J.B. Grade J.10).

THIRD ASSISTANT DISTRICT COMMERCIAL ENGINEER
(Dean Forest District).

Applicants should have had wide practical experience in the sale and installation of domestic and commercial electrical equipment and the work associated therewith. The successful applicant will be required to assist in all branches of commercial work, including advising consumers on domestic, commercial, and industrial equipment, estimating, contracting work and public lighting. Technical qualifications desirable. Salary £685/£730 per annum (N.J.B. Grade E.10).

Apply by letter, within 14 days, stating age, experience and qualifications, present position and salary to Mr. S. Raybould, Sub-Area Manager, Midlands Electricity Board, 126, London Road, Gloucester.

North Staffs. Sub-Area

SECOND ASSISTANT ENGINEER
(Stoke South District).

The successful applicant will be required to organize and develop sales of energy, appliances and installations. Applicants should have had a sound commercial background. Experience in direct selling, control of sales staff, advice to consumers on tariffs and correct use of electrical equipment, sales campaigns, exhibitions, and window dressing would be an advantage. Salary £835/£880 per annum (N.J.B. Class F, Grade 8).

Apply by letter, within 14 days, stating age, qualifications and experience, including present position and salary, to Mr. C. C. Pimble, Sub-Area Manager, 234, Victoria Road, Fenton, Stoke-on-Trent.

Shropshire and Herefordshire Sub-Area

SECOND ASSISTANT ENGINEER
(Commercial) (Headquarters).

Duties will include the preparation of estimates and tenders for large scale industrial, commercial and other installations, street lighting schemes, and the co-ordination of similar work in the districts of the Sub-Area. Applicants should have had a wide practical experience in all installation work and be familiar with modern practices and techniques. Some knowledge of industrial production practice would be an advantage. Salary £935/£995 per annum (N.J.B. Grade H.8).

Apply by letter, within 14 days, stating age, education, qualifications, experience, present position and salary to Mr. W. Winwood, Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

Wolverhampton and District Sub-Area

SECOND ASSISTANT DISTRICT ENGINEER (Cannock District).

Applicants should be technically qualified to at least H.N.C. standard, and should have experience in the construction, operation and maintenance of distribution systems. Duties will be mainly concerned with planning system reinforcements and mains extensions; and calculations and testing associated with protective gear. Salary £835/£880 per annum (N.J.B. Class E, Grade 7).

Apply by letter, within 14 days, stating age, experience, present position and salary to Mr. D. Holt, Sub-Area Manager, Midlands Electricity Board, 83, Darlington Street, Wolverhampton.

A. STEPHENS,
Secretary.

4039

NORTH EASTERN ELECTRICITY BOARD

Tees Sub-Area

APPLICATIONS are invited for the appointment of FIRST ASSISTANT DISTRICT COMMERCIAL ENGINEER, Middlesbrough District. Salary Schedule A, Class F, Grade 5, £995/£1,055. N.J.B. conditions of service.

Applications stating age, qualifications and experience to be received by the Assistant Secretary (Establishments), North Eastern Electricity Board, G.P.O. Box No. 117, Carliol House, Newcastle upon Tyne, within ten days of the appearance of this advertisement. 4061

SOUTH WESTERN ELECTRICITY BOARD

Plymouth District

FIRST ASSISTANT DISTRICT ENGINEER.

Salary according to Class G, Grade 5, £1,065 × £25 to £1,140 per annum of the N.J.B. Agreement.

The duties will be those generally capable of being undertaken by a first assistant engineer in a large undertaking. The particular duties to which the successful applicant will be assigned may vary from time to time.

Candidates should have extensive knowledge and wide experience of the operation and maintenance of a large distribution system, including protective gear, up to 33 kV, and knowledge of the forward planning and the preparation of capital applications. Applicants should either be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualifications.

Applications to be made on standard application form AE6/ACT, obtainable by postcard only, from District Manager, Armada Street, Plymouth. Closing date for receipt of completed applications is 18th July, 1958.

East Cornwall District (Liskeard)

SECOND ASSISTANT DISTRICT ENGINEER.

Salary according to Class E, Grade 7, £835 × £15 to £880 per annum of the N.J.B. Agreement.

Duties will include assistance in the construction, operation and maintenance of H.V and L.V. mains and substations on a mainly rural network. Applicants should have experience of all types of overhead line work.

Possession of technical qualifications at least equivalent to the Higher National Certificate in Electrical Engineering is desirable.

Applications to be made on standard application form AE6/ACT, obtainable by postcard only, from District Manager, South Western Electricity Board, Luxstowe, Liskeard. Closing date for receipt of completed applications is 18th July, 1958. 4055

ELECTRICAL DESIGNER

THE world's leading inventors and manufacturers of special-purpose precision machinery for the tobacco industry have opening in their London drawing office for :—

ELECTRICAL DESIGNER.

Desirable applicant should be aged 25-40, with technical qualifications at least up to H.N.C. level and with a broad background of experience in the design of electrical and electro-mechanical equipment as applied to precision machinery.

This opportunity is permanent and progressive ; it offers immediate pensionable monthly staff position with 3 weeks' annual holiday and other advantages.

Applications stating age, qualifications and experience should be personally addressed in confidence to G. B. Salmon.

MOLINS MACHINE CO. LTD.
Evelyn Street, London, S.E.8

3878

ELECTRICAL ENGINEER REQUIRED FOR GREECE

THE British-owned Athens Piræus Electricity Company requires a fully qualified British Electrical Engineer urgently. Short-term contract carries very substantial salary. Executive experience in similar company essential, preferably abroad. Age over 40. Responsibilities include labour utilisation within undertaking which employs 3,000 and also general administration work on engineering side.

Applications should be sent to the Secretary of the company's London Agents, Whitehall Securities Corporation Ltd., 47, Parliament St., London, S.W.1. 3972

FULLER ELECTRIC LIMITED

(a Member of the Hawker Siddeley Group)

require a qualified ELECTRICAL ENGINEER, aged about 30-40, preferably with transformer experience, to take charge of export sales. If necessary, supplementary training is envisaged to complement qualifications and experience possessed.

Applicants will be required to travel, with occasional lengthy absences abroad.

Excellent prospects of advancement for a man of outstanding ability and personality.

Applications, which will be treated in strictest confidence, giving full particulars of qualifications and experience and salary required, to be addressed to the Managing Director, Fullers Electric Ltd., Fulbourne Road, Walthamstow, London, E.17. 4074

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL

RESEARCH AND EXPERIMENTAL MECHANICS

required for reactor maintenance work. Duties include the repair, servicing and calibration of a wide range of instruments and electronic units. There are also vacancies in the control circuiting and light electrical field.

Applicants should have served a recognised apprenticeship or have received equivalent training. Some industrial experience is essential.

Working conditions are excellent. There are facilities for technical training and prospects of promotion to technical posts.

Accommodation will be provided for the successful applicants who live beyond daily travelling distance. Married men will be eligible for a house and a lodging allowance will be payable whilst waiting for a house and living apart from family.

Write for further details and application forms to—

Industrial Recruitment Office
A.E.R.E., Harwell
Didcot, Berks

4045

MIDDLESEX COUNTY COUNCIL EDUCATION COMMITTEE

Brunel College of Technology
Woodlands Avenue, Acton, London, W.3

APPLICATIONS are invited for the posts (2) of LECTURER in ELECTRICAL ENGINEERING. Candidates should be graduates with teaching, industrial or research experience. Experience or interest in automatic control, electrical machines or measurements an advantage. Staff encouraged to undertake research work and to maintain close contact with local industries.

Salary in accordance with the Burnham (Technical) Report, i.e. £1,200 × £30 to £1,350, plus London allowance.

Application forms (S.A.E.), returnable by 18th July, from the Principal.

C. E. GURR, M.Sc., Ph.D.,
Clerk to the Governing Body.
4065

BOROUGH POLYTECHNIC

Borough Road, London, S.E.1

Principal: James E. Garside, M.Sc.Tech., Ph.D., F.R.I.C., F.I.M., M.Inst.F.

APPLICATIONS are invited for the following posts available as from September next:—

Department of Electrical Engineering and Physics

ASSISTANT LECTURER (Grade B) in Illuminating Engineering.

Applicants should hold the Final Certificate of the C.G.L.I. in Illuminating Engineering and preferably be graduate members of either the Institution of Electrical Engineers or the Institute of Physics. Experience in the design and/or planning of lighting installations of various types desirable.

ASSISTANT LECTURER (Grade B) in Electrical Engineering.

Applicants should be graduates in electrical engineering and/or graduate members of the Institution of Electrical Engineers with industrial or teaching experience, preferably in light current work. Duties will be mainly in connection with National Certificate courses.

ASSISTANT LECTURER (Grade B) in Electrical Installation Work.

Applicants should be graduate members of the Institution of Electrical Engineers and have had wide experience of industrial electrical installation work. Teaching experience and C.G.L.I. qualifications in this work would be additional recommendations.

Salary scales £650 × £25 to £1,025 p.a., plus allowances for degrees, training, teaching and industrial experience.

To all salaries the "London allowance" (£36 or £48) is added.

Further particulars and form of application from the undersigned.

FREDK. J. PACKER,
Clerk to the Governing Body.
4063

JOSEPH LUCAS (ELECTRICAL) LIMITED

Great King Street, Birmingham, 19

ENGINEER

EXPANSION of development of ignition equipment for gas turbines and allied projects creates a vacancy for a practical engineer with experience of design for economic production of electrical apparatus. The work is of a high technical standard and applicants should preferably possess an honours degree.

The post is permanent and pensionable and offers considerable scope for advancement to a progressive engineer.

Apply in writing stating age, qualifications and experience to the Personnel Manager, Joseph Lucas (Electrical) Ltd., Great King Street, Birmingham, 19, quoting reference PM/D/190.

128

CENTRAL ELECTRICITY GENERATING BOARD

Midlands Division

GENERAL ASSISTANT ENGINEER is required at Stourport "A" and "B" Power Stations for generation operational duties. N.J.B. service conditions, superannuable appointment, salary within Schedule A, £740-£785 per annum. An additional 10% of basic salary is payable when engaged on shift duties.

The appointment is permanent with excellent opportunities for advancement. It is necessary that applicants should have received a sound technical training and should preferably have had some industrial engineering experience and have as a minimum qualification the Ordinary National Certificate.

Apply quoting vacancy number 826MD on form A.E.6 available from the Establishments Officer, Central Electricity Generating Board, 53, Wake Green Road, Moseley, Birmingham, 13, by 17th July, 1958. 4042

Situations Vacant (continued)

METHODS engineer. An experienced methods engineer required for interesting work connected with thermoplastic cable manufacture. The successful applicant will work entirely on method improvement, but some knowledge of work measurement is desirable. A degree or Higher National Certificate in Engineering would be an advantage, but consideration will be given to outstanding applicants lacking technical qualifications. Apply in writing, giving full details of qualifications, training and experience, to the Works Personnel Officer, British Insulated Callender's Cables Limited, Helsby, Nr. Warrington. 4005

NON-ring electrical conduit. Arthur Tipper Limited, of Willenhall (one of the Tipper Group) wish to appoint a real live representative to sell their conduit tubes and fittings in London and the Home Counties. This is an excellent opportunity for a man with a good knowledge of the trade and a sound connection. Only those with these qualifications should apply. 4030

OVERHEAD linesmen required for work in South Wales area. Applicants should be fully experienced and should write stating age and brief details of previous experience to—Box 3991.

QUALIFIED electrical engineer required by progressive West London company, capable of specifying, estimating for and supervising lighting contracts in connection with specialised ceiling work. Permanent position with good pay and conditions for the right man.—Box 4023.

SALES-design liaison. An interesting position with responsibility for qualified electrical engineer with mechanical experience. The post is a new one and entails control of estimating staff. It can be considered a senior position. Apply Sales Manager, Electric Motor Division, Newman Industries Ltd., Yate, Bristol. 3994

SALES technical engineer required by established electric motor manufacturer in London area. Genuine opportunity exists for man with good sales experience and progressive outlook. Apply in confidence giving age, salary required, qualifications, etc.—Box 3993.

SENIOR design draughtsman required. Must be O.N.C. standard and preferably with previous experience in small electro-mechanisms. Salary will be at a high level but will depend on applicant's previous experience and suitability. The company is engaged in the manufacture of electro-mechanical devices including thermostats for room, water and domestic equipment. It is particularly in connection with this range of instruments the company wishes to expand. Situated in the Greater London area, consideration will be given to housing assistance. Our staff have been advised of this vacancy and all applications will be treated in the strictest confidence.—Box 3975.

SENIOR electrical design engineer: A dynamic individual with substantial experience with rotating machines is required by a well-known manufacturer to take over development work on new ranges and products. Real opportunity for a man with ability. Remuneration commensurate with age, experience, qualifications, etc. Apply giving full details.—Box 4068.

TECHNICAL assistant required for drafting of electrical regulations, codes of practice, etc. Graduate I.E.E. or corresponding qualification necessary, also experience in committee work and drafting of reports. Comm. salary £775-£850, depending upon age and qualifications. Progressive post. Pension scheme.—Box 4009.

WORK study engineers. Both senior and junior work study engineers are required by British Insulated Callender's Cables Ltd. at their Erith Works, Belvedere, Kent. Candidates for senior positions should possess a degree or similar qualifications and should have had considerable experience in the application of work study to manufacturing processes. Applicants for the junior positions should be graduates or should have achieved H.N.C. or similar qualification, and would be expected to undergo a period of training. Good salaries commensurate with training and experience will be offered to suitable applicants who as staff members would be expected to join the company's pension fund. Amenities include canteen and sports facilities, and the normal office hours are 9 a.m. to 5.30 p.m. for a five-day week. These vacancies offer excellent prospects to successful applicants, and in the case of senior engineers housing assistance could be made available in appropriate cases. 4006

SALES manager required for an electrical wholesaling company in tropical Africa, handling radio, domestic appliances and installation materials. Wide experience in this field with keen interest in selling is essential. Generous starting salary and attractive conditions of service. To a man with adequate background this appointment offers unique opportunity for advancement in a company which is expanding rapidly. Particulars of experience, qualifications and age to—Box 4008.

APPOINTMENTS FILLED

Dissatisfaction having so often been expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

SITUATIONS WANTED

A.M.I.E.E. (32), wide experience in industry, power station engineering and contracting, seeks position in Lancs/Cheshire area.—Box 9402

B.Sc., A.M.I.E.E., 38, works engineering background, at present manager (commercial and technical) of overseas engineering company, invites proposals. Available interview U.K. now. Brief details please.—Box 9391.

BUYER, electrical manufacturing, seeks permanent position. Interested electronics. London or Provinces.—Box 9405.

CONSULTING engineers: Senior engineer requires appointment. Designs, specifications, supervision; 16 yrs.' experience.—Box 9401

ELEC. construction engineer seeks overseas contract. Extensive overseas history. Any field.—Box 9397.

ELECTRICAL supervisor (M.A.S.E.E.) requires situation with responsibility in the Tees-Tyne area. All offers seriously considered.—Box 9393.

ENGINEER (39), B.Sc., A.M.I.E.E., executive experience of development, project and sales of induction heating and control equipment, seeks progressive senior appointment.—Box 9398

SALES eng. requires position on North-East coast. Excellent connection with industry and shipbuilding in this area.—Box 9394.

ARTICLES FOR SALE

ELECTRIC MOTORS FOR SALE

FOUR 90-h.p. BRUSH Slipring Motors, 400/440-3-50-1,460 r.p.m., with o.i. starters.

45-h.p. BROOK S.C. Motor, 440-3-50-410 r.p.m., with o.i. Star Delta starter.

Five 200-h.p. E.C.C. 500-volt D.C. Motors, 425 r.p.m., with BROOKHIRST panels.

120-h.p. MET-VICK. 500-volt D.C. Motor, 500/700 r.p.m., with starter.

45-h.p. MET-VICK. 500-volt D.C. variable speed Motor, 500/1,000 r.p.m., with starter.

REED BROTHERS (ENGINEERING) LTD.
Replant Works
Woolwich Industrial Estate
London, S.E.18
(Telephone: Woolwich 7611/6) 4031

NEW OXFORD TRANSFORMER WELDERS

For Immediate Delivery

160/450 amp. sizes, oil cooled pattern for operation on 400/440 v. single phase, or 200/240 v., dual welding voltage 50/80; in-built coarse and fine regulators.

Prices as follows: 450 amp. £135.
350 amp. £99 10s.
250 amp. £71.
180 amp. £45.

GEORGE COHEN SONS & CO. LTD.
Wood Lane, London, W.12
(Tel. Shepherds Bush 2070) and
Stanningley, Nr. Leeds
(Tel. Pudsey 2241) 3850

GENERATORS

QUANTITY unused 30-kW compound wound Generators by MAWDSLEY, 225 volts, 1,100/1,450 r.p.m.

Immediate Delivery.

GEORGE COHEN SONS & CO. LTD.
Wood Lane, London, W.12
(Tel. Shepherds Bush 2070) and
Stanningley, Nr. Leeds
(Tel. Pudsey 2241) 3924

TURBO-ALTERNATOR SETS

500 volts, 3-phase, 50 cycles
for disposal in London area

1 1,000-kW ENGLISH ELECTRIC Pass-out Turbo-Alternator Set, with condenser, auxiliaries and switchgear, steam inlet 240 p.s.i., 630 F., pass-out 30 p.s.i., installed 1934.

1 1,000-kW RATEAU Turbo-Alternator Set, with condenser and auxiliaries, about 40 years old.

1 60-kW BROWETT LINDLEY/GENERAL ELECTRIC Engine-driven Alternator Set, steam inlet 240 p.s.i., about 40 years old.

For details apply Jas. Williamson & Son Ltd., Lune Mills, Lancaster. 3921

A.C. MOTORS, 3-PHASE, 50 CYCLES

H.P.	Maker	Speed	Voltage
650	CROM. PARK.	223 r.p.m.	3.3 kV
550	CROM. PARK.	223 r.p.m.	3 kV
500	GANZ	1,450 r.p.m.	500 v.
340	HARLAND	1,475 r.p.m.	3.3 kV
250	CROM. PARK.	750 r.p.m.	415 v.
220	G.E.C.	375 r.p.m.	3.3 kV

GEORGE COHEN SONS & CO. LTD.
Wood Lane, London, W.12
(Tel. Shepherds Bush 2070) and
Stanningley, Nr. Leeds
(Tel. Pudsey 2241) 3923

METROPOLITAN BOROUGH OF WANDSWORTH

Electric Motors

THE Council has for disposal two Electric Motors, BROOK, 15 h.p., 1,500 r.p.m., single-phase, 50 cycles, 205 v., complete with starters.

Further details from the Borough Engineer and Surveyor, Municipal Buildings, London, S.W.18.

R. H. JERMAN,
Town Clerk. 4069

ELECTRICAL EQUIPMENT FOR SALE

20-h.p., 400/3/50 Slipring Induction Motor, 720 r.p.m., complete with Brookhirst controller. Makers, LANCASHIRE DYNAMO & CRYPTO.

25-cwt. Electric Lift, 400/3/50, 4-stage, 68' 6" travel, cage 6' 11½" × 7' 1" × 6' 6" high. Makers, ETCHELLS, CONGDON & MUIR.

Full particulars from Walter Bower, Barlborough, Derbys. (Tel. Clowne 112). 4010

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PREPAYMENT and credit, 200/250 v. A.C., 1/p., 50 c., 2½-100 A. Fixed or variable tariff. Reconditioned, fully tested and guaranteed 2 years. Prompt delivery, carriage paid.

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(Tel. MOUntview 7944, 6373) 191

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UNIVERSAL ELECTRICAL CO.
221, City Road, London, E.C.1 37

A.A. ELECTRICAL Co. for A.C.-D.C. motors, switchgear, exhaust fans, hoists, reduction gears, new or reconditioned units.—CHI. 5105. 67. Rothschild Rd., London W.4. 57

A.C. and D.C. motors, generators, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. (Edgware 5566/9). 91

A.C. and D.C. 1/- slotmeters. Guaranteed 2 years, 2½-50 amps. From 50/-. Repairs and recalibrations. See Billiard: Tradex Meter Co., Surbiton (Tel. Elmbridge 4487). 169

ALTERNATORS, 3-phase, all sizes in stock from 7 kVA up to 330 kVA.—Britannia Manufacturing Co. Ltd., 20/26, Britannia Walk, London, N.1 (CLErkenwell 5512). 24

A BABCOCK & Wilcox water tube boiler will cut down your fuel costs; we can supply from stock. Two 40,000 lb. evap., 220 lb. w.p.; one 25,000 lb. evap., 200 lb. w.p.; 3,000 lb. evap., 400 lb. w.p.; Spencer Bonecourt boiler; also Marine, Cornish vertical, etc.—Burford, Taylor & Co. Ltd., Boiler Specialists, Burtayco House, Church Street, Middlesbrough (Tel. Middlesbrough 2622). 122

ALTERNATORS from ½ to 675kVA in stock, single and three-phase, all voltages and frequencies. Guaranteed. Many unused. Send your requirements.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 162

ALTERNATORS, generators, 1-100 kVA, all voltages. Specialists—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 147

BARGAINS in electric motors from A. Cooksley & Co. Ltd., 21/25, Tabernacle Street, London, E.C.2. Ring Monarch 3355. 50

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B.T.H. ¼-h.p. geared motors, 400 v., 3-ph., 50 c., 350 r.p.m., unused, £12 10s.—Universal Electrical Co., 221, City Rd., London, E.C.1. 3937

CABLE, underground, all types ex stock.—E. M. Tatton Co. Ltd., Kew Bridge, Brentford (EALing 3155/6). 117

CABLE, underground, PILC/VIR/LC, ex London stock. Cutting orders same day delivery London area. Send for priced stock lists. — Batt Electrical Co., 6, Dock Street, London, E.1 (Tel. ROYal 5905). 316

CIRCUIT breakers, various sizes in stock, A.C. and D.C., 200 amperes up to 2,000 amperes. Also dynamo and alternator switchboards. — Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 26

CONVERTERS and motor-alternators, 24, 110 and 220v. D.C. to 230/1/50 A.C., 125 watts to 6 kVA in stock.—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 150

CRANE motors. Direct current, series wound or compound wound, all voltages. We have large stocks.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 22

DIESEL generating sets, all sizes to 500 kW. Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 16

ELECTRIC motors, dynamos, alternators and motor generator sets of all sizes. We hold one of the largest stocks in England. New and reconditioned, with 12 months' guarantee.—Britannia Manufacturing Co. Ltd., Britannia Walk. London, N.1 (Clerkenwell 5512, 3 lines); also Works and Stores, Chobham, Surrey. 20

ELECTRIC motors, generators, control gear, transformers, A.C. and D.C., new and reconditioned; all covered with our usual 12 months' guarantee; large stocks available.—Electropower Co. Ltd., Kingsbury Works, Kingsbury Road, London, N.W.9 (Colindale 4621-2). 42

ELECTRIC motors, generators, motor generator sets, transformers, switchgear, etc., large comprehensive stock, overhauled and guaranteed. Copy of our Register, "Electrical Surplus," containing thousands of items of electrical plant, sent on request.—F. F. Winder Ltd., Belgrave Electrical Works, Leeds, 2. 54

ELECTRICAL equipment for sale: British Electric Transformer, 200kVA, 6,000-400v., 50 cycles, 3-phase; James Tate 150-kVA, 6,000-v. H.T. switchgear, complete with meters. No reasonable offers refused. Offers to—Chisholm & Co. Ltd., Sefton Works, Field Lane, Litherland, Liverpool. 3704

ELECTRICIANS. Send for details Shaftesbury lightweight "Bantam" ladders. Top sections fitted with patent moulded rubber blocks, eliminate possibility of scratching or marking walls, fascias, and other painted or highly polished surfaces. Also available for immediate delivery, steps, platform steps, trestles, telescopic trestles, pole and builders-type ladders, and all sizes of two and three-section extension ladders.—Shaftesbury Ladders Ltd. (E.R.), 453, Katherine Road, London, E.7 (Phone: Grangewood 3363/4). 111

FREQUENCY changers and variable frequency M/A sets in stock, and to specification.—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 148

FLAMEPROOF switchgear, lighting fittings, conduit fittings, motors, etc., always in stock. —Leighton Warehouse Co., 6, Church Road, Linslade, Leighton Buzzard, Beds. (Tel. No. L.B. 3400). 9341

FLUORESCENT fittings, lamps, starters and control gear for home and export. Fully guaranteed by actual manufacturers. Send for catalogues. — The Anglo-American Electrical Company, Olive Street, Bury, Lancs. 245

FLUORESCENT tubes reconditioned and guaranteed as new for 7s. 6d. each. Free collection and delivery in Lancs and Yorks.—The Anglo-American Electrical Company, Bury New Road, Breightmet, Bolton, Lancs. (Telephone, Bolton 7251). 212

FOR disposal: 2 350-h.p. Asea reduction-geared electric motors with starting equipment. Motor speed 1,420 r.p.m. Output speed 309 r.p.m., 400 volts, 3-phase, 50 cycles. All in excellent condition. Also varying lengths of 0.2" and 0.1" paper-insulated, lead-covered and wire-armoured cables. — Edwards & Bryning Ltd., Castle Works, Rochdale. 4070

FRACTIONAL h.p. motors, new, ex stock. A.C./D.C., Universal, B.T.H., Delco-Remy, G.E.C., Fracmo, Newman, Scophony. — Jeary Electrical Co. Ltd., 5, Lamb's Buildings, London, E.C.1. 126

GENERATING plants of all types, new and reconditioned up to 100 kVA in stock. Special plants built to order at short notice; automatic mains failure, etc. — Powerco Ltd., 312, York Rd., London S.W.18 (VAN. 5234). 151

GENERATING sets for sale, petrol, diesel and steam, from 1 kW up to 700 kW, A.C. and D.C. switchboards.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 163

HIGH frequency alternators and converters, 400 to 2,600 cycles up to 6 kVA in stock. Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 149

MERCURY-arc rectifier by Hackbridge & Hewittic. Output 35 kW at 220 voltage D.C. Fitted ammeter, voltmeter, breaker, etc., and complete with oil-cooled input transformer designed for 415 volts A.C. Used for one week only after installation.—Chandler's Ford Laundry Ltd., Chandler's Ford, Hants. 3995

MOTOR generator sets and converters, all sizes and voltages from ½kW up to 500kW in stock. — Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Tel. Clerkenwell 5512, 5513 & 5514). 12

MOTOR generators of all types in stock and to specification up to approx. 100 kW.—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 152

MOTORS, starters, circuit breakers. Huge stocks of all types, ½ to 300 h.p. Stock list or quote by return.—J. S. Ramsbottom & Co. Ltd., Bow St., Keighley (3774-5-6). 70

NAMEPLATES, engraving, diesinking, stencils. — Stilwell & Sons Ltd., 153, Far Gosford Street, Coventry. 108

NEW electric motors for disposal. All 400/440/3/50, protected and totally enclosed. We are offering these at considerably reduced prices.—Carter & Co., Nelson, Lancs. 9385

PHASE converters, single to three-phase, several sizes in stock up to 90 h.p., 3-phase loading. — Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 29

PLATING dynamos and motor generator sets, various sizes from 500 amps. up to 2,000 amps., with A.C. or D.C. motors.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 15

POLYPHASE kilowatt hour meters. Available from stock.—Universal Electrical, 221, City Road. London, E.C.1. 40

PREPAYMENT 1s. slot house service meters. —Universal Electrical, 217-221, City Road. London, E.C.1. 36

PURLEY chokes and ballasts. Our 80-w. tapped h.p.f. ballast with starter switch-holder incorporated is proving itself the most popular unit. Suitable for most fittings. 57s. 6d. each subject. — F. F. Blanshard Ltd. (Dept. ER), Purley, Surrey (Uplands 4818/9). 52

QUARTERLY Credit Meters, single & poly-phase, 2½-100 amps. From 17/6d. Also D.C. See Television.—Tradex, Surbiton. 171

ROTARY converters in stock, all sizes; enquiries invited. — Universal Electrical, 221, City Road, London, E.C.1. 34

SLYDLOK fuses for sale.—Ryness Supplies, 37, Goodge Street, London, W.1. 284

SMALL BR screws and nuts in steel, brass and stainless steel, from stock. — Premier Screws & Repetition Co. Ltd., Woodgate, Leicester. 180

TELEVISION slotmeters & Time Switches. Details from: Tradex Meter Co., Surbiton. Elmbridge 4487. 172

VENNER time switches, 200-240 v. A.C./D.C., 10-50 amps., 75s. each.—Universal Electrical Co., 221, City Rd., London, E.C.1. 38

WARD Leonard motor generating sets, all sizes.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1 (Tel. Clerkenwell 5512). 10

100 reels (100 yds. per reel) 7/036 electric cable, brand new, cheap to clear.—Walban Transport Ltd., c/o 126, Wing Road, Linslade, Leighton Buzzard, Beds. 9400

400-cycle to 1,500-cycle motor alternators and alternators.—Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 27

5,000-volt flash or insulation testers by famous makers offered as M.O.S. surplus. Output voltage 0-5,000 v. A.C. and D.C. continuously variable from zero. Current 10 ma/A.C. and 5 ma/D.C. Power supply 200/250 v. A.C., 50 cycles. A beautiful brand new instrument in modern sheet steel case with fully protective features incorporated, which may be ordered with every confidence at the unrepeatable figure of £27 10s. each delivered.—J. H. Elsby, Market Vaults, Market Street West, Birkenhead (Tel. 8966). 4011

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RELIABLE, self-contained diesel electric generating sets for hire, 2.5 to 260 kW. Night and day maintenance service. Quotations by return. — Whitetrade Limited, Rochester, Kent (Tel. Chatham 41133, 3 lines). 294

ARTICLES WANTED

HARRINGTON & Sons, reclamation contractors, want redundant A.C./D.C. electric motors and transformers, stocks of cable, etc. — 109, Beaconsfield Street, New Beckton, East Ham, London, E.6 (ALB. 1388). 315

OSCILLOSCOPE and camera or camera wanted for Cossor C.R.O. type 339. Working order.—Box 3926.

QUICKSILVER & beryllium copper urgently required for best prices and prompt cash.—Sterling Products Ltd. (Ealing 9248). 293

SURPLUS laminations, enamel copper wire, screws, nuts, flex. Good prices paid. Full details to—Box 199.

WANTED, D.C. and A.C. ball-bearing motors, motor generator sets, dynamos and alternators. Full details to — Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 13

WANTED for prompt cash, ferrous and non-ferrous scrap, also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. & H. Cooper Ltd., 176, Brady St., Bethnal Green, London, E.1. 120

WANTED, rotary converters, any sizes.—Universal, 221 City Rd., London E.C.1. 35

WANTED, surplus stock cable, all types and sizes. We can inspect.—Box 220.

WORK WANTED AND OFFERED

A.C. and D.C. motor rewinds and repairs. Prompt service, fully guaranteed.—Edgware 5566/9; Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. 92

FLUORESCENT tube reconditioning service, guaranteed work, competitive prices.—E. J. Dawes Ltd., Erimus Works, Stockton St., Middlesbrough (Tel. Middlesbrough 2718). 282

GLASSFIBRE reinforced plastic mouldings by Payne & Payne Ltd., 6/10, Priory Mews, London, S.W.8. Own design and pattern making dept. Expert laminating team.—Tel. MACaulay 7587. 9388

REWINDS up to 50 h.p. Vac. arm. (10-12 slots) rewound, 30s., post 31s. 6d.—Finchley Rewinds, 23 South Rd. Edgware (Tel. 3770). 9403

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AGENCIES

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MANUFACTURERS of electrical control equipment with works in Essex require experienced representatives in the Midlands and North of England.
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MISCELLANEOUS

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NOTICE is hereby given that the Transfer Books and Register of Members of the Company will be closed from the 16th to 24th July, 1958, both days inclusive.
By Order of the Board,
H. L. W. ALDRIDGE,
Secretary.
72-82, Salusbury Road,
Kilburn, London, N.W.6. 4012

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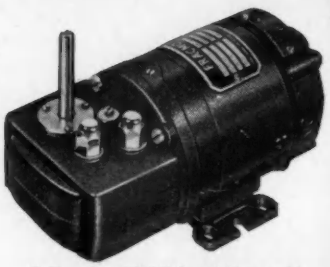

● Illus.: Type 334C40 Geared Motor, with A.C. and D.C. interchangeable frames 1-20 r.p.m. Torque: 20-10 lbs/ins.

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Simple attachments instantly convert the Blower into a powerful, extremely portable industrial Vacuum Cleaner suitable for cleaning machinery, stock bins, walls, overhead beams, etc.

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COMPANY MEETINGS

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Mr. Fred. T. Jackson on a Well-equipped Organisation

THE 29th Annual General Meeting of Telephone Rentals Limited was held on 27th June at Caxton Hall, Westminster, London, S.W.1, Mr. Fred. T. Jackson, O.B.E., Comp. I.E.E. (the Chairman), presiding.

The Secretary (Mr. W. J. H. Ainley) read the notice convening the meeting and the report of the auditors.

The following is the statement by the Chairman which had been circulated with the report and accounts for the year ended 31st December, 1957 :—

You will have seen from the Balance Sheet and Profit and Loss Account that we have had another successful year, showing an increase of profits. At a time like this, with so much industrial unrest, a Co-Partnership, or Profit Participation Scheme, shows itself to great advantage, for it identifies the employees with the objects of the company, and brings about full realisation by them that the success or otherwise of the company depends upon their individual efforts. We place a very great importance on the service we render to our subscribers, and we are sure that the increase in our business is to no small extent due to the reputation for personal service we have built up.

I am pleased to be able to tell you that our business has continued to expand, and, during the first four months of this year, we again exceeded our target for new rents. At the same time, although we have started the new year very well, it is impossible for me to prophesy as to the current year's results on four months' experience. I have to take into consideration the fact that, undoubtedly, it is more difficult to do business this year than it was last year, but we are well equipped financially and otherwise to deal with any situation which might arise.

Our business has expanded so rapidly that it is necessary that we should move to new Head Office premises during the middle of this year. As things are at present, we have various departments spread over three different centres in London and we think it would be advantageous to have all these Head Office departments under one roof.

Overseas Activities

I will now deal with our operations in the Commonwealth.

The business in Australia continues to expand and is earning satisfactory profits. Taking all circumstances into consideration, and particularly the steady progress made during the past few years, it was decided to declare a dividend for the first time. I would remind you that we do not own the whole of the Australian business, but we have a 50% shareholding.

In South Africa, with both the Johannesburg and Cape Town companies, the rate of expansion has again been most satisfactory. Johannesburg has been financially self-supporting for some years, and Cape Town is now very close to becoming so.

Canada is still a hard furrow to plough, but is progressing steadily. Although not yet on a profit-earning basis, I am glad to report that the loss for the year under review was considerably reduced. The annual increase in revenue compares very favourably with our smaller branches at home and abroad, but overhead expenses are inevitably at a higher level.

Accounts

I will now comment on the Accounts.

Profit and Loss Account

The Gross Profit of £875,370 is an all-time record and is £121,631 greater than that for the previous year. This result is entirely accounted for by the increase in Rental Revenue and the Profit on Trading and Miscellaneous Receipts, for the combined Dividends and Interest receivable from Subsidiary Companies and other sources show a reduction of £1,720. Dividends from Subsidiaries are down by some £14,000, the profit figure of one subsidiary having been considerably reduced as a result of certain accounting changes in depreciation rates and stock values of recovered equipment. This, however, is but a temporary situation, and provided they continue at their present level of business the changes made in 1957 should have the effect of increasing profit figures in future years. Dividends and Interest receivable from other sources show an increase of £12,283 over 1956, due to the temporary investment of our greater liquid resources.

Income Tax and Profits Tax are up by no less than £52,042, and the Chancellor's proposal in his last Budget to levy one rate of Profits Tax was warmly welcomed by your Board, for had the proposed rate been applicable to our profit for 1957 there would have been a saving of approximately £10,000. Over the years one has learnt to be grateful for even the smallest relief from the penal burden of taxation.

The Net Profit, before transfers to Reserves and provision for Dividends at £474,356, is up by £69,589, a most gratifying result.

We have again this year transferred £200,000 to the General Reserve, which now stands at £1,550,000. We have also transferred an amount of £25,000 to the Contingencies Reserve as a precautionary measure, although the Reserve, as it stood at the date of the last Balance Sheet, is still more than sufficient to cover the accumulated losses of our Canadian Subsidiaries. Finally, we have transferred a further £76,000 to the Tax Equalisation Reserve, which now totals £756,000 and which was created in 1955 for the purpose explained in my statements of the last two years.

After providing for these transfers to Reserves and the Dividends on both the Preference and Ordinary Shares amounting to £162,150 as compared with £152,030 in 1956, we are left with an unappropriated balance of £163,580 to be carried forward to the current year. The increase in the amount of the Dividends is, of course, due to the fact that the Interim Dividend was paid on the Capital as increased in January, 1957, whereas the corresponding payment in respect of the year 1956 was made on the Ordinary Capital as it stood before the last issue.

Balance Sheet

Liabilities

Both the Authorised and Issued Capitals have been increased since the date of the last Balance Sheet following upon the passing of the Special Resolution to increase the former, and the subsequent Rights Issue in January, 1957, which raised the latter. This issue also accounts for the substantial increase in the Share Premium Account, the details of which are set out in the Printed Accounts.

Capital Reserves now total £264,821 and Revenue Reserves £1,675,000, and the Shareholders' interests consisting of Capital, Reserves and unappropriated Profit balance amount to £4,615,401, as compared with £3,867,050 at the end of 1956.

The increase of £124,500 in the Reserves for future taxation is accounted for by the additional transfer to the Tax Equalisation Reserve mentioned previously and the increased liability to Income Tax on the Profits as per these Accounts.

The total of our Current Liabilities shows a very slight increase over the previous year, but, as you will see from the details printed in the Accounts, there is nothing abnormal or which calls for comment.

Assets

Referring now to the Assets side of the Balance Sheet, the value of the revenue-bearing Installations after Depreciation has increased by £308,988 to £3,453,844, which is equivalent to 1.40 years' rent.

Freehold and Leasehold Properties and Office Furniture and Fittings, Vans and Cars reflect but little change, and the Trade Investment representing our holding in the Australian Company remains unchanged.

The increase of £44,995 in Investments in Subsidiary Companies represents amounts capitalised in our Canadian Subsidiaries during 1957. This sum comprises the total cash and goods supplied during the year. Loans to Subsidiaries are unchanged, whilst the amounts due on current accounts are reduced by £10,562.

Stock and Work in Progress at £567,832 show the substantial reduction of £128,757 as compared with the previous year, whilst Sundry Debtors and Prepayments have increased by £52,031 to £339,529. The majority of this increase, £38,000 in fact, represents subscribers' accounts in amounts invoiced during the year.

The difference in Quoted and Unquoted Investments between the two years reveals an exchange from an Australian Government Issue to an Australian Debenture, which was made when the former matured.

Our liquid resources in the form of Tax Reserve Certificates, Deposits with Local Authorities and Cash, both in London and Australia, at £1,159,925 are £609,404 higher than they were at the end of 1956. This increase in our liquidity is in the main due to the proceeds from the Rights Issue in January, 1957, amounting to a net £510,863, and the decrease in our Stocks held of £128,757.

We have been steadily building up and strengthening our organisation since the war, and your Board, realising during 1956 that there were excellent prospects of a record year in 1957, were determined that this time we were not going to be restricted in our expansion for lack of the necessary finance, particularly bearing in mind our experiences during the credit squeeze of 1951-52.

Your Board, therefore, wished to make certain that finance was available before they went ahead with their plans for the further expansion of your company, both at home and overseas.

Consolidated Balance Sheet and Profit and Loss Account

The Consolidated Accounts having been prepared on an identical basis to that of the Parent Company, the material changes have already been dealt with in the foregoing remarks, with one exception, and I refer to the note on the Consolidated Balance Sheet concerning Other Capital Reserves, which is self-explanatory.

The Net Profit of the Group before taxation is £927,653, compared with £789,103 for 1956. After providing for taxation, the transfers to Reserves, and Dividends, the balance of unappropriated Profits carried forward and attributable to the Holding Company's Shareholders amounts to £272,417.

Conclusion

In conclusion, I think you will agree with me that the Accounts and Report reflect an even stronger and healthier position than last year, and it is the constant endeavour of us all to preserve this state of affairs.

The report and accounts were adopted, and the dividends, as recommended, were approved.

The retiring director, Mr. Fred. T. Jackson, was re-elected, and the remuneration of the auditors, Messrs. Chas. W. Rooke, Lane & Co., having been fixed, the proceedings terminated. 4024

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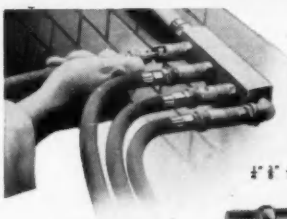

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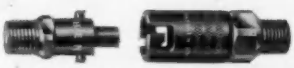

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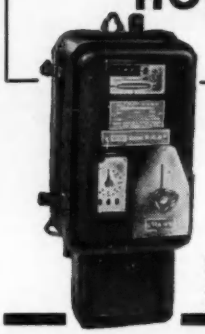

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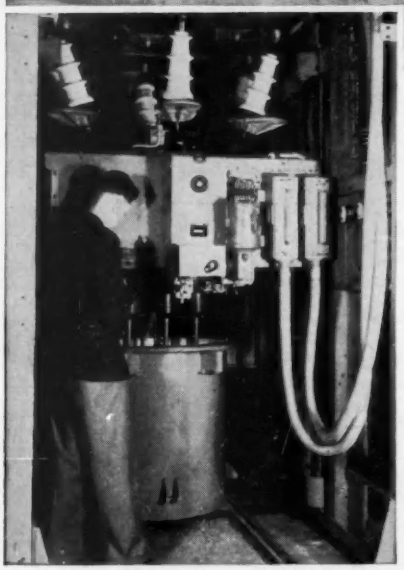

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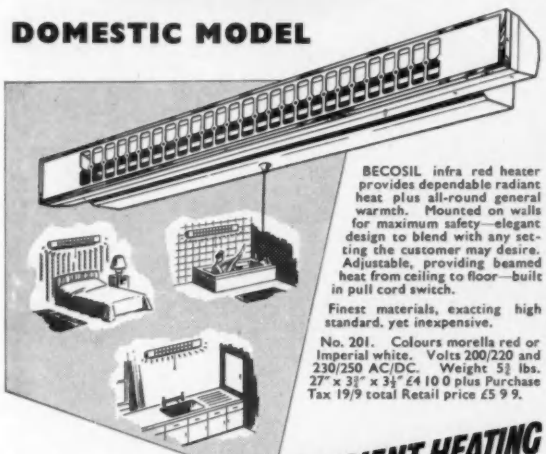

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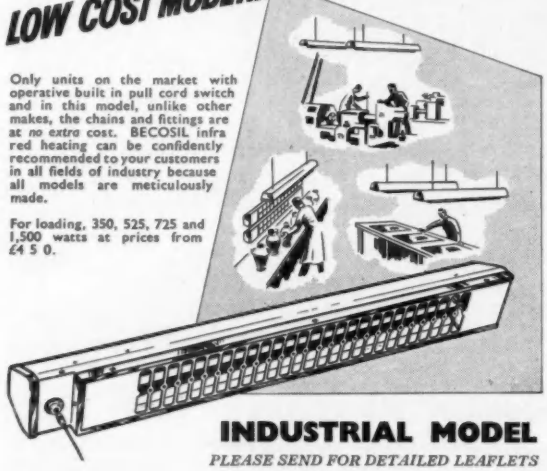

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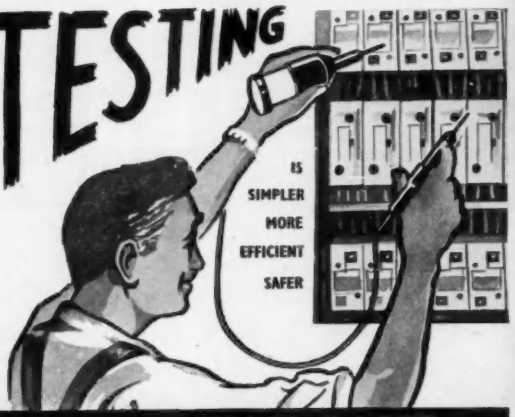

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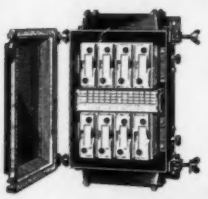

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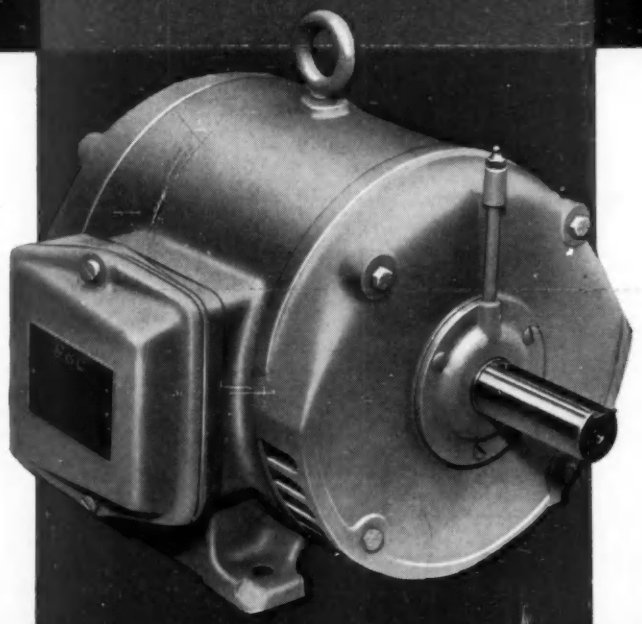

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